

AIRFIX magazine

DECEMBER 1970

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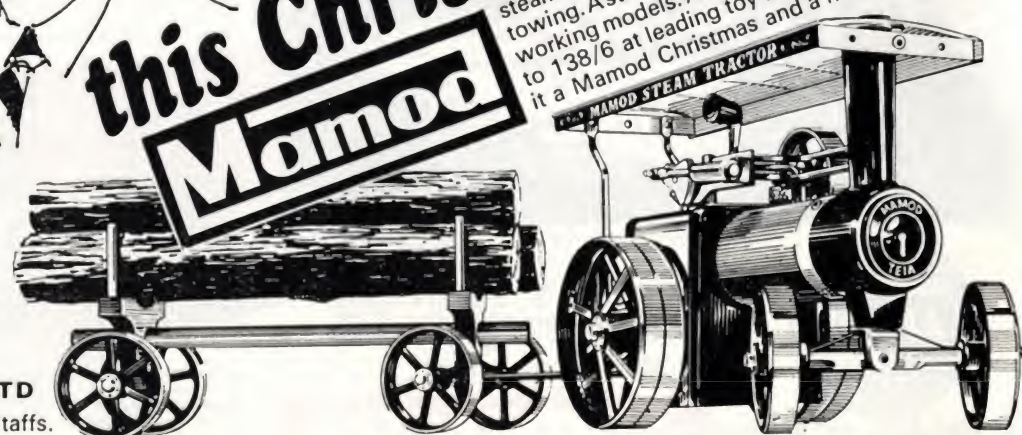


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CONGRATULATIONS!

TO - SIR THOMAS SOPWITH, C.B.E.

WHO, ON 21st NOVEMBER, 1970, WILL HAVE HELD FOR SIXTY YEARS (EXACTLY) HIS PILOT'S CERTIFICATE No. 31, ISSUED BY THE ROYAL AERO CLUB.

ON THIS SAME DATE WILL BE PUBLISHED —

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RUSSIAN TANKS 1900-1970

Russian Tanks 1900-1970

The complete illustrated history of Soviet armoured theory and design

John Milsom



The tanks of the Soviet armed forces today constitute the most powerful non-nuclear offensive weapons in the world. The development of this formidable tank arm has a long history which dates back to the earliest use of military armoured vehicles. *Russian Tanks, 1900-1970* details the complete development history from the earliest vehicles, through the Second World War and the 1960s.

Soviet tanks—including the famed T-34 and Stalin tanks—brought a fear hitherto unknown into the hearts of panzer troops. During the Second World War the number of Soviet tanks always matched, if not exceeded, that of the Germans; the German initial devastation of the Soviet army was not the result of superiority of numbers or ability but rather of Stalin's purging of the officer corps in the 1930s.

This superb encyclopaedic book presents, for the first time, the complete story of the development and tactical evolution of the Soviet armoured forces. It

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The illustrated history of Soviet armoured theory and design, written by JOHN MILSOM

describes the design, development, technical characteristics and combat use of all the famous Russian tanks right up to the present day. A large amount of the material has never been published in English before.

The first part of *Russian Tanks, 1900-1970* outlines the comprehensive development of the tank and other armoured fighting vehicles in Russia during the development phase. It also describes how the Soviets contemplated their use, how various military interactions affected both technical and tactical trends, and how the Soviets have come to have, today, the most powerful armoured force in the world. In order to place the evolution in its right perspective, John Milsom includes, industrial, political and military trends which have taken place in the Soviet Union over the past six decades and provides perspective of similar developments in other countries leading to the advancement of Soviet mechanized warfare.

The second part of the work describes the evolution of the various types of armoured vehicles after the industrialization period up until the present day, giving—vehicle by vehicle—full technical details and illustrations of the various models. **This detailed section of the work, with a very large number of illustrations, will be of particular value to all who study the individual tanks and especially to modellers.**

Although termed a history of Russian tanks, this book also describes the complete development history of other forms of armour developed in the Soviet Union—armoured cars, ar-

moured personnel carriers, self-propelled weapons, specialized armour, etc.

The photographs in *Russian Tanks, 1900-1970* present a unique pictorial coverage of Russian armoured fighting vehicles. The majority have never been published in the West, certainly not in volume form, and where they have appeared before it has only been in journals not readily accessible even to the student of the subject and even then often incorrectly designated or inadequately captioned.

The data tables are a distillation of technical information about every tank taken into service by the Soviet army. Here is presented a reference listing which has been compiled as the result of years of comparative study of journals and documents published in Russia, and many countries outside, or released by military authorities. The reference value of the work is further enhanced by the bibliography. This listing of books and articles, published both in Russia and outside, more than demonstrates the author's research but provides a tool for students of armoured fighting vehicle study and literature.

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I. V. Hogg



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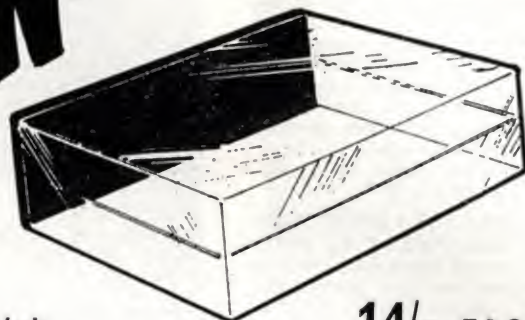
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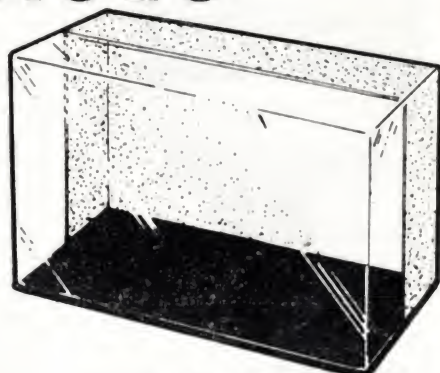
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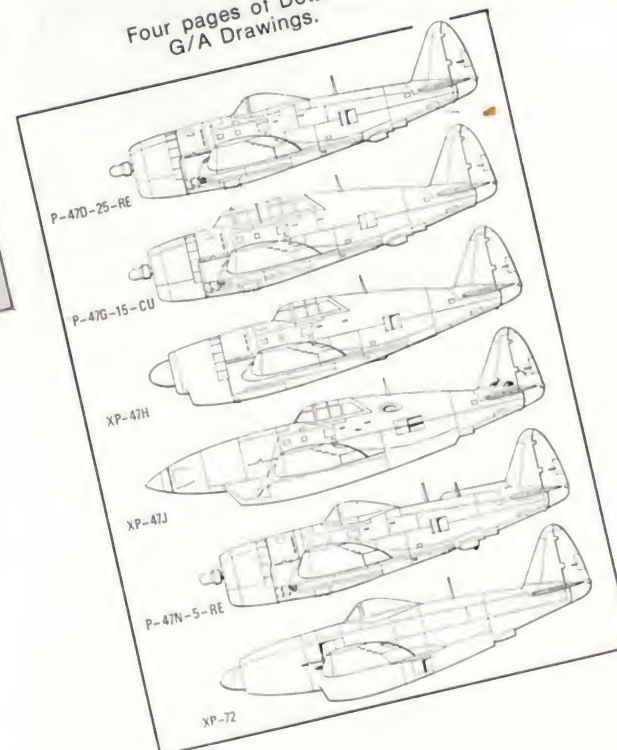
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AIRFIX magazine

AIRFIX magazine FOR PLASTIC MODELLERS

December 1970

Volume 12 No 4

Editor Chris Ellis

Cover Picture

An ex-USAF P-51D of the Royal New Zealand Air Force pictured at Omaka, Blenheim, in 1958 just at the end of its service career. It is in the markings of No 3 (Canterbury) Territorial Sqn and carries the lettering No. 3 (CANTERBURY) TERRITORIAL SQUADRON with below it ROYAL NEW ZEALAND AIR FORCE all in 1½ inch high white lettering shaded red, port side only, immediately above the exhausts. Wings, ailerons, elevators, rudder, and undercarriage doors are painted high speed silver while the rest is natural metal. There is a thin band on the spinner midway between the prop blades and the tip, and the prop tips are white not yellow. Cockpit and wheel well interiors were zinc chromate as was the radio mast. Seat and inside of undercarriage doors were medium green while the tailwheel doors were natural metal inside and out. Serial is NZ2427 with the last two digits repeated under the lip of the nose intake; serials were not painted under the wings, however. A sister aircraft from the same squadron is still in existence, NZ2417, though now painted in civilian colours. This latter machine was similarly marked but was painted silver with no surfaces at all in natural metal, while the roundels had medium blue rather than dark blue bands.
(Picture by Robert E. Montgomery)

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BOOKS for modellers

Unless otherwise stated, books reviewed are normally available from your local bookshop or from hobby shops which sell books for enthusiasts, including the mail order stockists advertising in this magazine. As a last resort they can be obtained from the publishers whose addresses are given when known. In all cases of mail order, however, suitable postage should be added to the selling prices quoted.

MILITARY

L'Uniforme et les Armes des Soldats de la Guerre, 1914-1918. Vol 1.

L. and F. Funcken.

Castermann, available in Britain from Historex Agents, 3 Castle Street, Dover, Kent.

£2 plus 4s 6d postage.

THIS is another in the excellent all colour series which has already taken in the Napoleonic period and a general coverage of uniforms over the centuries. We commented favourably on the earlier volumes and have nothing but praise for the excellence of this new book. Volume 1 covers infantry, armour, and aircraft while the second volume, in preparation, will cover all other arms. All nations involved in the Great War are included and for a single volume an amazing amount of detail is packed in, right down to badges, principal decorations, weapons, and so on. In fact almost everything the average enthusiast would need to know about the uniforms of the period can be found in this book. We would say it is essential reading for anyone wishing to paint up the Airfix 1914-18 OO/HO soldiers correctly. The text is in French but it is easy enough to follow for anyone with a smattering of the language. The authors' strong point is uniforms, and it must be said that the tanks and aircraft featured in this book are less well done; purists will find plenty to fault in such matters as aircraft colour schemes. However, this is essentially a book on uniforms and judged as such it represents a first class buy.

Wehrmacht Divisional Signs.

Theodor Hartmann, drawings by Brian Davis.

Almark Publishing Co Ltd, 104-106 Watling Avenue, Edgware, Middx.

25s (paperback) or 33s (hardback).

MUCH thicker than any previous Almark book, this volume nonetheless follows the same style as before and presents the histories, compositions, home districts, commanders, operations, and emblems of about 100 German Army and Luftwaffe divisions in World War 2. These are virtually the top 100 of the several hundred divisions which existed. While some divisions covered, notably the panzer divisions, are well-known, this book includes infantry, panzer-grenadier, mountain, and parachute divisions, many of which will be new to most people. A total of 117 emblems (including variations) are shown, all in their actual colours when the black and white emblems are included. Eight pages are full colour plates. A useful twin index enables any emblem to be identified very quickly. There are about 36 pictures, most of them hitherto unpub-

lished and mostly showing vehicles carrying divisional signs. This appears to be the first book to cover the subject (at least in this comprehensive manner) and with 88 pages represents good value in a useful and interesting reference book.

The Hitler Album. Vol 1.

Roger James Bender.

R. J. Bender Publishing Co, PO Box 1425, Mountain View, Calif 94040, USA. Available in Britain from Graham K. Scott, 2 The Broadway, Friern Barnet Road, London N11.

£4 16s, plus 4s postage.

THIS interesting volume has its origin in the official picture album which was made in a limited edition in 1937 to record Mussolini's State Visit to Germany. The event received the full treatment of the Nazi propaganda machine with lavish parades, receptions, rallies, and military displays to impress both the Duce and the world at large. Numerous pictures were taken for the official albums and the present book is a sort of semi-facsimile presentation, showing the original album pictures plus a few more to complete the coverage. There is a day by day narrative of events. For the student of German uniforms the pictures are, of course, superb. Brief captions are given with the pictures and these could really have been a little more informative, particularly in the case of the weapons which are only vaguely identified. There is a 'de luxe' leather-style binding which captures the flavour of the period and the pictures for the most part reproduce very well.

Through to 1970.

Colonel R. M. Adams.

Royal Signals Institution, Cheltenham Terrace, London, SW3.

12s 6d.

RECOUNTING in a very readable way the history of the Signals services in the British and Indian Armies since 1870, this book is an absolute 'must' for military enthusiasts. Nearly all of its 122 pages carry one or more illustrations, some of them 'naturals' as the basis for models, of men and equipment in a variety of campaigns. Lavishly produced and with a number of colour plates among the illustrations, this is one of the best 12s 6d worths we have come across for a long while.

The Sharpshooters.

Borris Mollo.

Historical Research Unit, 27 Emperors Gate, London SW7.

30s.

A MOST interesting little book that recounts the whole history in peace and war of this famous Yeomanry regiment, this volume has a number of good illustrations including a coloured Simpkin

painting as a frontispiece which depicts a mounted officer in the hussar-style full dress uniform of 1910. Modellers are well catered for by the rare photographs which cover most of the uniforms worn over the years, and also varied types of armoured vehicles used in later years. Another colour plate shows the regimental guidon and there are drawings of the different badge styles over the years. All in all a great deal of information is presented concisely and attractively, very much better than the more usual style of regimental history.

Uniforms of the SS: Vol 3, SS-Verfuegungstruppe, 1933-39.

Andrew Mollo and Hugh Page Taylor.

Historical Research Unit, 27 Emperors Gate, London SW7.

£3.

ONE of the best-produced books we've seen in recent months, this lavishly produced volume is one of a series dealing in great detail with the SS and covering uniforms, equipment, and organisation. Volume 3 covers what was later to be known as the Waffen-SS in the years preceding the declaration of war. It makes a fascinating inventory of just about every item of dress and equipment that existed. The book starts with histories of SS-VT units, then covers general uniform detail, goes on to insignia (covered in immense detail), and then covers dress equipment. As an example of the detail covered in depth, two pages are devoted to the special white leather equipment introduced for the LAH regiment. Musical instruments are not forgotten, with the 'Jingling Johnnies' and drum and trumpet banners shown in full detail, while regimental banners and standards are, of course, also included. Relevant regulations are quoted in many instances. There is generous use of colour in the illustrations, and dozens of rare and well reproduced pictures complete an exhaustive record of the subject. For the keen student of German military affairs, this is a most absorbing and interesting addition to the library.

RAILWAYS

Industrial Steam Album.

M. J. Fox and G. D. King.

Ian Allan Ltd, Terminal House, Shepperton, Middx.

50s.

ONE of the railway pictorial albums which Ian Allan do so well, this beautifully produced volume is one of the most interesting yet for it covers ground unfamiliar to many but absorbing for its charm and character. As the authors point out in the lengthy text, though steam has disappeared from mainline railways, there is still some to be found on industrial lines. The variety is enormous from ex-mainline locomotives and stock to specially built small engines from such well-known specialist firms as Peckett, Hunslet and Sentinel. There is much standard gauge and plenty of narrow gauge, in fact types of railway to appeal to every taste. Small sheds, tiny loading bays, unfenced road crossings, coaling staities, antique signals and wagons, these are all characteristics of industrial steam. The book covers the lot in great detail—it is thicker than many other volumes in the series. For anyone seeking new ideas for model railways this is a particularly inspiring book. Even if you've no room for a normal OO/HO model layout, you should be able to find a

Continued on page 201

AIRFIX magazine

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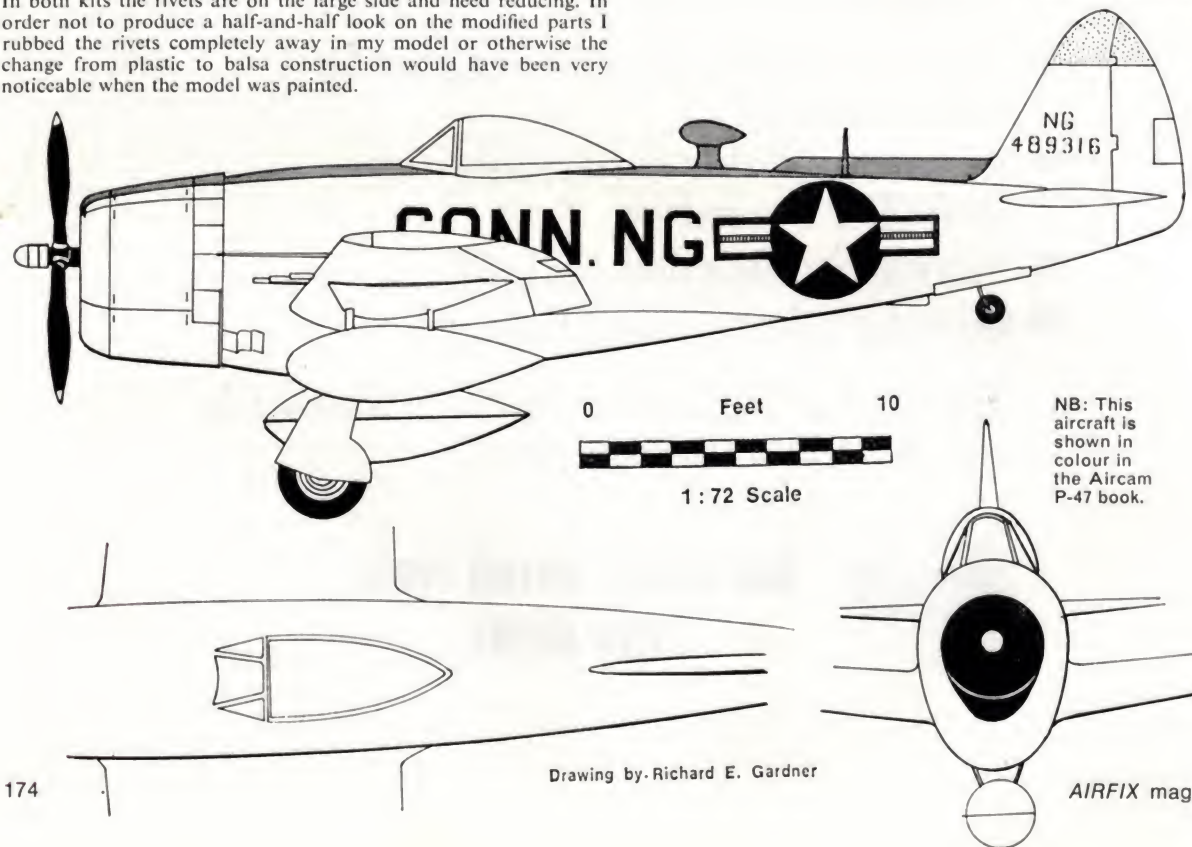


The P-47N

SIMPLE BUBBLE-HOOD THUNDERBOLT CONVERSION BY ALAN W. HALL

ONE Airfix kit that I have not so far mentioned in my monthly conversion articles has been the P-47 Thunderbolt. With the availability of the Revell 1:72 scale P-47D model at almost the same price as the Airfix one there was little point in giving directions on how to produce this bubble-canopied version of the 'D' from the 'razor-back'. There is however one variant of the world-famous 'Jug' that I did not consider and this is the P-47N. I have therefore produced one of these using as a basis the Airfix model but with the rider that it can just as easily be built from the Revell kit.

To build an 'N' model from the Airfix version is quite a challenge as it means cutting away the rear part of the fuselage and carrying out major surgery on the wings. There is also the problem of making a new canopy but in this article I have dispensed with that particular job for the sake of speed and have, in fact, combined both the Revell and Airfix kits. Of the two models I think that the Airfix one has a slight edge over the other particularly in the moulding of the undercarriage. This has much more detail, looks more accurate but at the same time does need slight alteration to improve its final appearance. In both kits the rivets are on the large side and need reducing. In order not to produce a half-and-half look on the modified parts I rubbed the rivets completely away in my model or otherwise the change from plastic to balsa construction would have been very noticeable when the model was painted.



Reference material on Thunderbolts is profuse though it did take me a little time to find just what I wanted for a P-47N scheme. The Aircam No 2 book on the subject provided the answer and there are six pictures in this volume, mostly of Air National Guard aircraft, but all very attractive. Other illustrations and a three-view drawing were found in William Green's *Aircraft of the Second World War*, Vol 4.



Wing and fuselage surgery. Note the shape cut from the original wing plastic to avoid removal of the guns, leading edge shape, and flap area. Fuselage and wing balsa additions were cut from 1/4 inch sheets.

STAGE 1 Using Airfix parts I assembled the fuselage halves, wing halves and the engine and cowling. The engine itself was, of course, painted before sticking it in place inside the cowling and all parts were allowed 24 hours to dry out thoroughly before the construction work began.

STAGE 2 Starting with the fuselage first I removed the rear part of the top decking with a fret saw from a point level with the cockpit coaming. The line ran back to the base of the fin and when clear the gap was cleaned up with a coarse file, levelled and a piece of 1/4 inch thick balsa 2 1/2 inches long stuck in place. The wings involved a much more complicated cut as I wished to preserve as much as possible

Continued on page 205

GREENWOOD & BALL

ANCIENT ERA

ROMAN EMPIRE c. 60 AD

- RE1 Mounted Legate
- RE2 Praetorian Centurion, crested helmet and cloak
- RE3 Praetorian Guardsman, half armour, pili and shield
- RE4 Praetorian Guardsman, parade dress, half armour, pili, shield, cloak and crested helmet
- RE5 Legionary Centurion
- RE5A Legionary Centurion, parade dress, transverse crested helmet
- RE6 Legionary, half armour, pili and shield
- RE6A Legionary marching, half armour, pili and shield
- RE7 Legionary, parade dress, half armour, pili, shield and crested helmet
- RE8 Signifer (Standard Bearer)
- RE8A Praetorian Standard Bearer
- RE9 Aquilifer (Eagle Bearer)
- RE10 Auxiliary Legionary, leather armour, pili and shield
- RE11 Auxiliary Slinger with shield, unarmoured
- RE13 Auxiliary Archer, leather armour
- RE14 Auxiliary Javelinman, leather armour and shield
- RE14A Auxiliary Light Javelinman with shield, unarmoured
- RE14B Auxiliary, leather armour, spear and shield
- RE15 Artilleryman with ballistrajavelin
- RE16 Artilleryman with catapult stone
- RE17 Artilleryman standing
- REC1 Cavalry Officer
- REC2 Cavalry Standard Bearer
- REC3 Cavalryman, half armour, spear and shield
- REC4 Cavalryman, leather armour, javelin and shield
- REC5 African Auxiliary Cavalryman with javelin and shield, unarmoured
- REC6 Cavalryman, parade dress, half armour, spear, shield and cloak

CARTHAGE c. 200 BC

- C1 Infantryman, half armour, shield and pike
- C6 Officer, crested helmet, leopard skin cloak
- C7 Standard Bearer
- C9 Drummer

PERSIAN EMPIRE c. 500 BC

- PE1 Mounted General
- PE2 Immortal, half armour, spear and shield, bow in case
- PE3 Infantryman, half armour, spear and shield
- PE4 Infantryman with spear and shield and bow in case, unarmoured
- PE5 Archer firing, unarmoured
- PE6 Javelinman, half armour
- PE7 Officer
- PE8 Standard Bearer
- PEC1 Cavalry Officer
- PEC2 Cavalryman with spear and bow in case, unarmoured
- PEC3 Cavalryman, half armour, spear and shield
- PEC4 Cavalryman with spear and shield and bow in case, unarmoured
- PEC6 Cataphract, full mail with spear and shield, bow in case and armoured horse
- PEA1 Egyptian Auxiliary, half armour, spear and shield
- PEA2 Assyrian Auxiliary, full mail, spear and shield and bow in case
- PEA3 Phrygian Auxiliary, half armour, spear and shield, crested helmet
- PEA4 Phrygian Auxiliary, half armour and long axe, crested helmet
- PEA6 Assyrian Auxiliary, half armour, spear and shield

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SARMATIA c. 100 AD

- SAC4 Cataphract with lance (Kontos), full mail, armoured horse

GREECE c. 490 BC

- G2 Hoplite (for use with phalanx) with pike, Corinthian-type helmet crested
- G3 Hoplite with spear, Corinthian helmet crested
- G4 Officer, Corinthian helmet crested with cloak
- G5 Standard Bearer
- G6 Trumpeter
- G8 Archer with cuirass, attic helmet crested
- G9 Archer, unarmoured
- G10 Soinger with shield, unarmoured
- G11 Pelast with javelin, unarmoured
- GC3 Cavalryman, half armour, Boeotian helmet and shield
- GC4 Cavalryman with javelin, unarmoured
- GC5 Cavalryman, leather armour, spear and shield, attic helmet crested

GAULS c. 400 AD

- GA3 Officer, crested helmet, half armour
- GA4 Infantryman with spear and shield, unarmoured
- GA5 Trumpeter
- GAC1 Cavalryman with spear and shield and cloak, unarmoured

EQUIPMENT

- V4 Heavy Caraballista
- V5 Catapult

MEDIEVAL ERA c. 1300

- M1 Foot Soldier with poleaxe
- M2 Foot Soldier with long spear and shield
- MCI Mounted Knight with lance and shield

NAPOLEONIC ERA

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- French Infantry... Grenadier of the Guard
- Fusilier
- Line Grenadier
- French Cavalry... Mameluke
- Cuirassier
- Chasseur a Cheval
- Hussar

WORLD WAR II

- MG1 German Infantry with rifle and bayonet
- MG2 German Panzer Grenadier with S.M.G.
- MG3 German Officer kneeling, holding Luger binoculars
- MG4 German Infantry kneeling
- MG5 German Infantry kneeling, holding ammunition belt
- MG6 German machine gun and tripod

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THE GARRISON

Right: Line up of conversions made from the vehicles in the Airfix RAF Emergency Set. From left can be seen an Austin K6/ZB Signals Van, Guy FBAX GS Truck, Austin K3/YF GS Truck, and Austin K6 Breakdown Gantry.



Truck Conversions

FROM THE AIRFIX RAF EMERGENCY SET
BY GERALD SCARBOROUGH

THE 6 x 4 trucks drawn this month, Guy FBAX Breakdown Gantry, Austin K 3/YF 3 ton GS Truck, and the Austin K6/ZB Signals/Wireless Van, are all based on the K6 fire tender kit. There are many variations possible from these drawings; for example, the breakdown gantry on the Guy could, as an alternative, be fitted to the Austin K6 or a sided truck body could be fitted to the Guy (as in the photographs), or to the Austin K6. I have become involved in wargames and needed GS Trucks so in fact made up the Guy using the Airfix Matador body. This gave a good strong structure to withstand the constant handling involved in wargames and yet provided a simple model that was a little bit different. The sides on the Matador are unfortunately not high enough to use it for the K3/YF so this has to be scratch built.

Guy FBAX 6 x 4 Breakdown Gantry

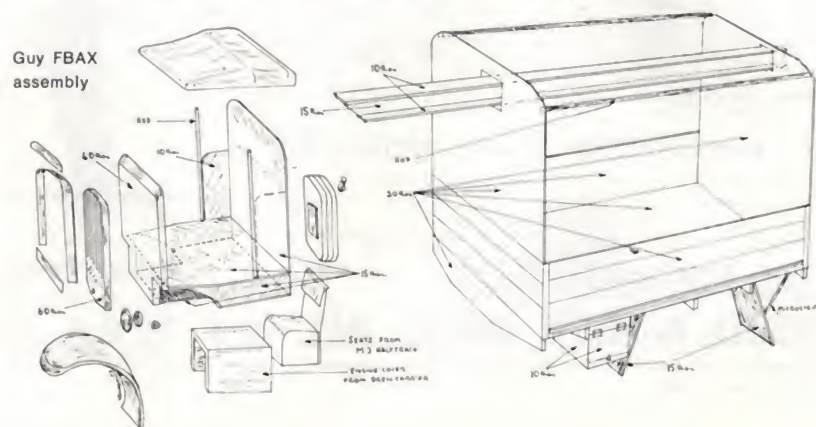
The exploded drawing will show the construction involved in the cab and body; start with the cab floor, the two small shaped sides underneath, and the underfloor. Add the back, making sure it is vertical, then the engine cover (I used part of part No 10 from a Universal Carrier), the cab front, steering wheel and column, seats and the sides to the back. At this stage it is as well to paint the inside before fitting the plastic rod handrails and the hood. For the hood I used the front portion from an '88' Flak Gun Tractor, sanded thinner at the front, or it can be scratch built as described for the Austin K3. The radiator is cut from 60 thou plastic card scored vertically to within approximately 2.5 mm of the bottom. A hole is drilled for the starting handle, while surround and parts of the front are made from Microstrip. The front mudguards are cut from part No 23 from the Austin K6, and lights are punched discs on a slice of sprue. The fuel tank on the rear of the cab is from three bases from the personnel in the Emergency Set sandwiched together and sanded to shape with a filler from sprue. Make up the K6 chassis (part No 3) but first cut off the fuel tank, add the springs and axles but adjust the distance between the rear bogie centres to 16 mm. Paint all wheels and tyres, including the



As explained here, bodies can be interchanged to some extent. Models show a Guy FBAX GS Truck and Austin K6 Breakdown Gantry, still made up from drawings on opposite page, however.

spare and the chassis parts that will be inaccessible later, and then mount the cab, using scrap under the floor to obtain the correct 'sit'.

The body is a very simple structure of 20 thou plastic card. Remember to score in the planking before assembly, add the ends from 20 thou (with an aperture cut out for the jib), and make rod or sprue spacers and sheet supports. Make up the H section jib and cement in place. Cover



first the ends with crumpled tissue and then with a strip from one side over the top and down the other side. Add the body bearers, tool boxes, rear mudguards, etc., and fit squarely to the chassis.

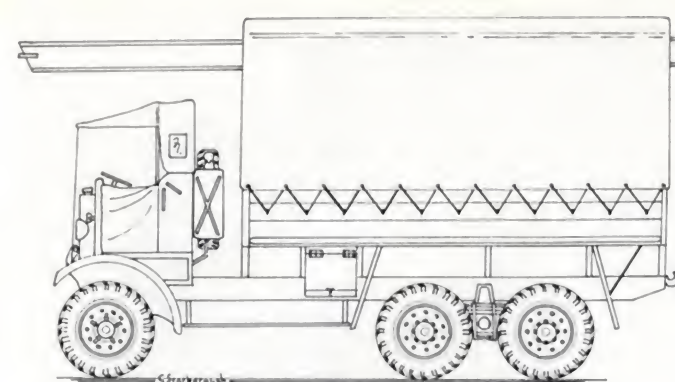
To make up the GS Truck version with the Matador body you will need the sides (parts 16, 18, 19 and 20) and the bottom, part No 17. The bottom should be reversed so that the bearer at the end comes to the rear. Make up an extra bearer from 20 thou plastic card to go at the front and add a strip of thick Microstrip across between each bearer.

Austin K3/YF 6 x 4 3 ton GS Truck

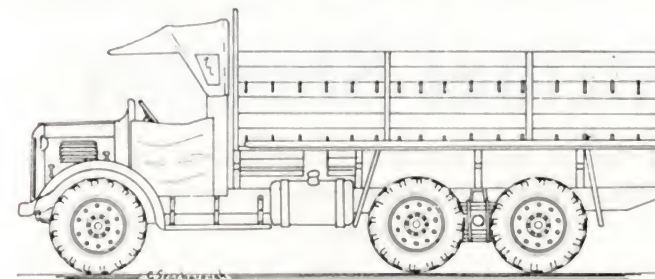
The K3/YF truck is the early type from Austin with an open cab and civilian type front. It is a simple model to make as it is only necessary to marry the cab of the K3 ambulance to the chassis of the K6. Commence construction by removing the windscreen and shaving off the folded side curtains from part No A37 and then build up parts A36, A37, A38, and A40 to A43. Cut the front 15 mm from part A1, that is at the point just behind where the floor steps up. This is easiest to do by turning the part over and sawing vertically with the saw blade up against the step in level. After cleaning up the floor, assemble to part A3 and the bonnet/cab front already constructed. Paint inside and then add the back followed by the completed hood as per the sketch, and finally add the tissue paper 'doors'.

The chassis is modified by cutting off the fuel tank, adjusting the distance between bogie centres to 16 mm and by shaving off approximately 1.5 mm from the front to allow the K3 cab to seat properly. Make up a larger fuel tank from scrap card and use the K3 axle (part A13) which will have to be slightly altered to fit to the springs. Make certain all the wheels touch the ground before

Continued on page 181



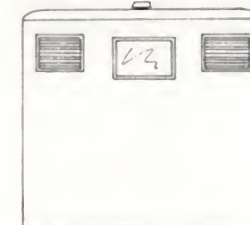
(Above) Guy FBAX Breakdown Gantry



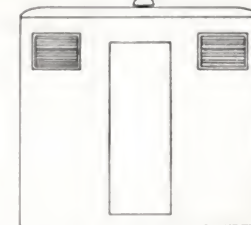
Austin K3
cab parts



CAB REAR



Signals Van
assembly

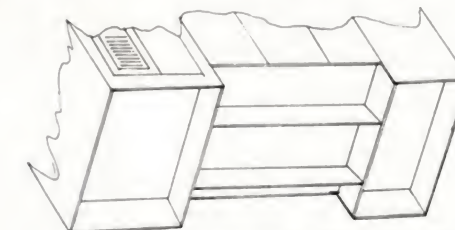
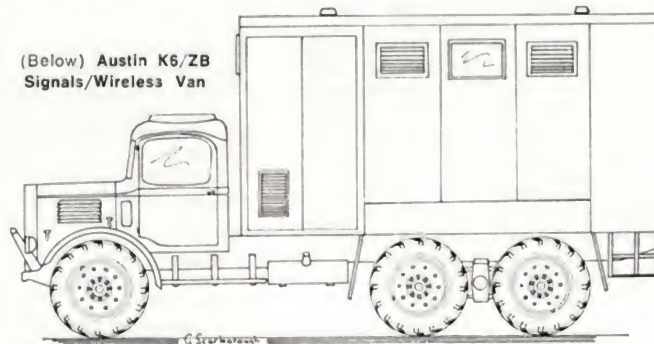


(Right) Signals
Van body
underside

Austin K3/YF
3 ton GS Truck

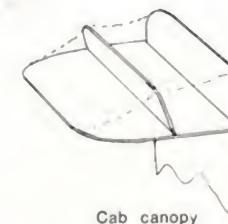


(Below) Austin K6/ZB
Signals/Wireless Van



Above: Austin K6 Signals Truck. A whole range of simple trucks can be made using the tips and drawings given here.

Elevations are
1:76 scale



Cab canopy
assembly for
Austin K3

Right: Another view of the Austin K3 3 ton GS Truck, a particularly easy and useful conversion.





BY **NORMAN SIMMONS**



Sentinel Shunter

An attractive and unusual locomotive kit in plastic card which is easy to build

PROTOTYPE MODELS, 2 Northampton Road, West Haddon, Rugby, Warwicks, have shown a high degree of initiative with their recently introduced 4 mm scale kit for a Sentinel Shunter. The kit is somewhat novel since the parts are printed on plastic card, the first occasion we have met this form of 'plastic kit'. The economy of printed plastic card compared with moulded plastic is obvious and on a basically simple model such as this the result is almost as good.

The kit is for the body only which is designed to fit on the Tri-ang X3121 diesel multiple-unit power car motor bogie. Needless to say the side frames of this bogie differ from the underframe details of a Sentinel Shunter and no attempt is made or suggested in the instruction sheet to alter this part but, when viewing the model, one's attention is drawn more to the body and the underframe tends to be largely overlooked. In any case the underframe is not so outrageously different that it matters so very much.

The plastic card used in the kit appears to be 20 thou thickness which at first glance seems to be on the flimsy side but such is the design of the model that it forms a robust unit when assembled and 20 thou is, for practical purposes, thick enough. The footplate assembly is particularly well thought out. The card parts are accurately printed and when the footplate is assembled it fits over the Tri-ang motor bogie like a glove. Only two slight modifications were needed which were not referred to in the otherwise complete instruction sheet and they were very simple. One was to file the end of the brass bolt which projects on one side of the magnet since otherwise the tip of the bolt fouled the inside edge of one side of the footplate. An alternative method might be to cut a notch in the footplate which would clear the bolt. Either way would be equally satisfactory. The other modification needed was to cut two small semi-circles, one at each end, in the ends of the lower footplate (Part No 1) which I found necessary to

clear the domed shaped caps in the ends of the drive shaft bearings on the motor bogie. Fig 1 illustrates both these modifications.

The buffers are, very sensibly, cast white metal parts. They form part of a stem of small castings which also include the water tank filler, chimney, coupling hooks, whistle and one other part which I have not been able to identify. It looks very much like an alternative chimney with a representation of a domed shape spark arresting cover over the top and it may very well be so but nothing is mentioned about it in the instruction sheet.

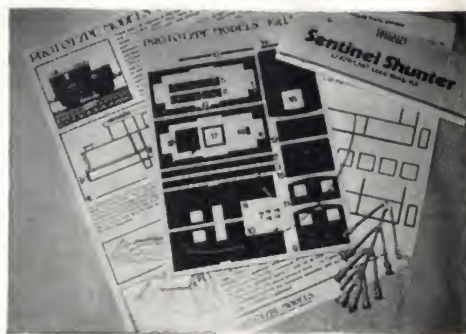
Drill size 50 is suggested in the instruction sheet for drilling the buffer beams to take the buffers but unless the shanks on the buffers are considerably reduced in diameter something larger than a No 50 drill was found to be required. A number 41 or 42 was found to be nearer the mark but even so the projections at the backs of the buffers needed to be touched up with a file to produce a more circular shape as otherwise they were rather more oval than circular.

I was not happy with the coupling hooks. Not that there was anything wrong with the coupling hooks themselves, just that the amount of clearance available behind the buffer beam due to the proximity of the drive shaft bearings on the motor bogie is so limited that there does not appear to be room enough to fit them satisfactorily. I preferred to fit the brass type coupling hooks as supplied by Jackson or ERG in their 3-link coupling sets since it is possible to bend the end of the hook through 90 degrees so that it can be held in place behind the buffer beam. Each hook was fixed by strips of plastic card cemented to the back of the buffer beam around the hook. See Fig 2. The added strength of the stem of the hook embedded in the plastic card adds a useful bit of reinforcement to the buffer beams. If Tri-ang

couplings are preferred then there is one already fitted at one end of the motor bogies. The instruction sheet gives a clever suggestion for fitting a Tri-ang style coupling bar at the other end.

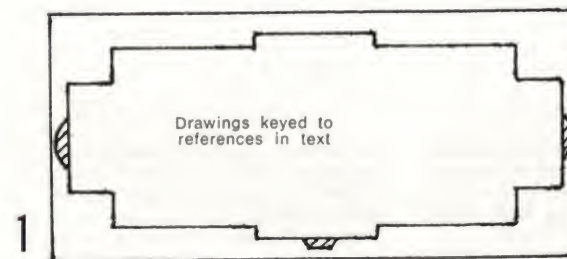
Construction of the body is very straightforward provided the parts are cut out accurately and the instruction sheet is followed. It is perhaps a good idea to put the two side pieces together back to back after cutting out to make sure they match up in all directions. I found I had cut one slightly higher than the other which might have thrown the finished model out of alignment if it had not been discovered before assembly. The suggestion in the instruction sheet to put right angled strengtheners in the corners is a sound one. Another idea which is worth following is to cement strips of plastic card about 2 mm wide into the corners as shown at Fig 3(a) so that the corners can be rounded as shown at Fig 3(b). This is a dodge remembered from the old Modelcraft 'Lineside Lorries' series where the sides and ends were made from three separate layers of card, each progressively shorter in

Below: The kit parts laid out as purchased. Body parts are numbered on the plastic card to aid assembly.



length working from the outside so that they fitted into each other at the corners. The resultant joins, besides having considerable strength, could be filed, carved and sandpapered to give a nice rounded effect.

These 'Lineside Lorries', which incidentally included buses as well, were excellent building sheets and could well stand reprinting today on plastic card which material was not thought of when the sheets were first published. To return to Sentinel Shunters, they did in fact



Remove shaded areas at ends to clear drive shaft bearings; remove shaded area at side to clear magnet bolt

have the corners of their bodywork rounded. Judging by photographs I have seen the curvature was at least 6 inches in radius, say 2 mm on the model. One advantage of this kit being produced in plastic card is that the waste material after the parts have been cut out can also be made use of. All the odd bits of plastic card which were used in strengthening the body were of course taken from the off-cuts.

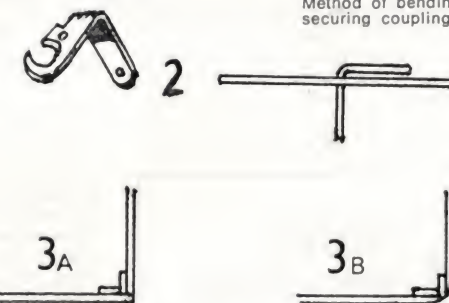
Also included in the kit is a sheet of printed raised body details such as ventilators, window frames and beadings. So far as I can tell these are printed on ordinary good quality glazed paper but it was found that they would adhere to the plastic card body parts with a wash of liquid cement. Eight handrail knobs are included and a length of nickel silver handrail wire. The wire can also be used for the Tri-ang coupling bar and the side steps under the cab entrance.

The finished model is visually quite attractive and potentially useful on a layout. The prototypes of the model were to be found on both the LMS and the LNER. The LNER had by far the largest stock. They in fact formed two classes; Y1 and Y3 which were visually identical in appearance but the Y1 Class had only one speed whereas the Y3 Class had a two-speed gear.

The original LNER numbers were very haphazard as were most LNER engine numbers at the time but some semblance of order was introduced in the re-numbering scheme which was prepared by the LNER in 1943 but was not actually put into operation until January 1946. Then Class Y1 became Nos 8130-53 and Class Y3 became Nos 8154-85. The allotted old and new numbers are as follows, the first column showing the



Method of bending and securing coupling hook



new number at January 1946 and the second column showing the old.

8130	7772	8144	124	8158	193	8172	62
8131	8401	8145	142	8159	196	8173	63
8132	4991	8146	150	8160	197	8174	64
8133	4992	8147	171	8161	198	8175	65
8134	4993	8148	174	8162	21	8176	78
8135	7774	8149	175	8163	23	8177	96
8136	44	8150	183	8164	35	8178	98
8137	79	8151	187	8165	42	8179	94
8138	9529	8152	45	8166	49	8180	117
8139	19	8153	59	8167	60	8181	154
8140	100	8154	81	8168	61	8182	148
8141	106	8155	90	8169	87	8183	155
8142	108	8156	189	8170	18	8184	172
8143	119	8157	192	8171	55	8185	86

A feature of the LNER Sentinel Shunters is that pre-second world war they were painted in LNER green livery and Prototype Models have catered for this by producing two kits; one printed all black with red buffer beams and the other with the body parts, excluding the footplate printed in LNER green. Standard LNER lettering was carried on the side panels at the narrow coal bunker/water tank end and the numbering between the cab entrance and the side ventilator under the cab window. Post-



The two views on these pages show the LNER version of the model; note the dummy coal added in the bunker. Top of page: Underside view shows superstructure assembly.

nationalisation the positions were reversed as the numbers were placed on the narrow end and the BR crest under the cab window. 60000 as appropriate to all ex-LNER locomotives was, of course, added to the numbers after nationalisation. Subsequently certain locomotives passed into Departmental stock when they were re-numbered again, as follows. The date is also given when the re-numbering took place:

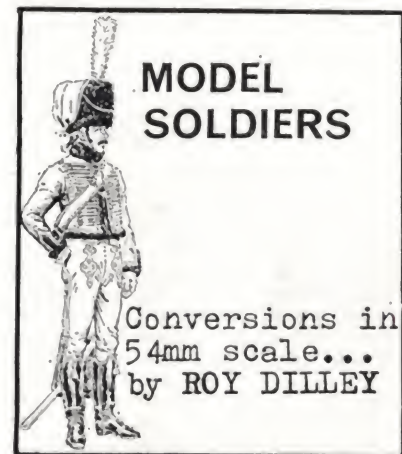
68130	D37	1953	68160	D57	1956
68131	D39	1953	68162	D21	1956
68132	D4	1953	68165	D5	1953
68133	D6	1953	68166	D7	1953
68136	D51	1953	68168	D38	1953
			68173	D40	1953
			68177	D41	1953
			68178	D42	1953
			68181	D3	1953
			68183	D8	1955

The ex-LMS Sentinel Shunters as portrayed in this kit were far fewer in number there being only Nos 7180-3 which became 47180-3 as at nationalisation. I have notes of three of these locomotives being shedded at Shrewsbury, Ayr, and Sutton Oak which indicates that they were widely scattered.

Congratulations are due to Prototype Models for these two new and interesting kits. One cannot ask for more since the Sentinel Shunters were unique and there is no other type that I can think of that could be produced in plastic card with such simplicity as this. I am sure, however, that the 'Lineside Lorries' technique could be used to produce a model LNER Sentinel Steam Railcar which, I feel certain, would go down well with modellers!

The Tri-ang multiple unit power bogie has to be purchased separately, of course. This can be had by post from Jones Bros, 56 Turnham Green Terrace, London W4, at 44s plus a little extra for postage.

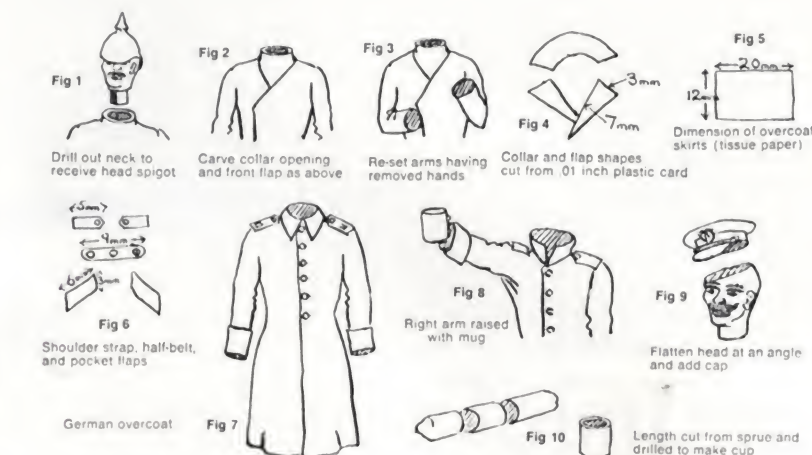
PERHAPS the most difficult part of a model figure to paint is the face, yet it is frequently by this very feature that, from the viewpoint of conviction, the whole piece stands or falls. How many times have we not all seen a model, anatomically correct, well-posed, and painted with care, failing to convince by reason of a sketchy, doll-like, or caricature-like rendering of the countenance. By the same token, pieces, indifferent as to anatomy and pose, have often been given distinction by an effective facial expression. What then can the modeller do to obtain satisfactory results from this aspect of his work? Obviously 'practice makes perfect', and 'there is no substitute for experience', are relevant proverbs in this respect, but even a beginner can achieve a large measure of success by the application of some of the techniques



that I find useful in my own pursuit of the hobby.

Painting a miniature's face has a great deal in common with the preparation of a full size person's features with make-up for a theatrical performance. Just as on a stage the lighting is so arranged that practically all shadows on an 'untreated' face are eliminated, so, with a miniature figure, the limitations imposed by size, and the fact that light both direct and reflected tends to come from all round, have the same flattening-out effect. It therefore becomes necessary, in order to restore form, to accentuate natural highlights and shadows, and varying their shapes and intensities helps to convey age, mood, and character. Reference to a book on stage make-up will prove extremely useful, and suitable volumes can be found at most public libraries.

My own recipe for painting a face is quite simple, but remarkably effective, and capable of considerable variation to represent characteristics dictated by colour, circumstance, and environment. On a clean palette, or sheet of glass, I put small blobs of colour, red, white, yellow, blue and black. Then by blending small quantities of each together I arrive at a suitable basic flesh shade for the



particular figure on which I am working. By adding more or less of the darker colours to yellow and white one can obtain the whole range of flesh tones from the damask cheek of a child to the sun-burnt skin of a veteran. Incidentally, don't be afraid to make use of blue in your flesh mixes, it has an excellent toning down effect, and prevents the starkness of red, white and yellow mixed without a toner.

Having arrived at the desired basic flesh, I apply this to the entire head of the figure, and, while it is still wet, blend in with a little brown or black added to the mix, the whole beard growing area of the face, only a slight darkening being necessary for a freshly shaven subject and becoming progressively more intense as a more stubbly effect is required. The heavy lines from the nose to each corner of the mouth are now blended in, again using brown added to the basic mix, and the eye sockets and the shadows under the nose, mouth and chin are indicated with the same colour. Both sides of the nose are also darkened, and a more intense tone given to the nostrils and ear orifices. A little red in the flesh is applied over the cheeks and blended back towards the ears. Next comes the whites of the eyes, with a blue or brown iris in each occupying the full depth of the whites. Care is taken to see that the eyes

Colouring Details

British Soldier

Cap: Khaki.
Overcoat: Khaki with dull brass buttons.
Trousers and Puttees: Khaki.
Boots: Semi-matt black.
Bottle: Dark green glossy. (Paint with matt paint then coat with clear varnish.)
Cigar: Brownish-green.

German Soldier

Pickelhaube: Field grey. (This is Rose Model head No. GW11.)
Overcoat: Dark-grey with dull brass buttons.
Shoulder-straps: Field-grey piped with red.
Trousers: Field-grey.
Boots: Light brown (untanned leather).
Mugs: Dull aluminium, or white enamelled.
Crates: Dirty wood.
Base: Dark earth. (Coarse sand sprinkled on to plastic base coated with Unibond.)

are in an identical position, and any suggestion of cross-eyes or a squint is avoided. Using a cocktail stick or very finely pointed brush, I put in the eye pupils with gloss black, and in most cases also add a tiny spot of white to each iris to represent the 'light'.

Having decided the hair colour, I use this to paint in the upper eyelashes, following the natural curve of the eye, then the eyebrows and hair. A little reddish brown in the basic mix supplies the shade for the lower lip which is filled in next, a slightly darker version of the same mix being used for the upper lip. Finally, a touch of white in the flesh colour is employed to highlight the ridge of the nose, the top surfaces of the nostrils, and the upper part of the chin. The essential thing in all these operations is to blend colours carefully one in another, with the exception of the hard shadows of nostrils and ears.

If you carry out all these steps as described, you should be able to produce acceptable faces for your figures straight away, and the more you paint, the better they will become. These techniques can be applied to depict all types and nationalities, the basic mix, of course, being varied to suit.

Since the Festive Season is with us once more, I thought it would be appropriate for this month's conversions to have some relevance to it, and decided to model German and British soldiers enjoying the Christmas Truce of 1914.

Descriptions of this remarkable event were noticeably missing from official dispatches of the time, authorities on both sides having, no doubt, their own reasons for disapproving of the spontaneous fraternisation that took place between the front line soldiers. Although not universal along the whole line, the unofficial truce certainly extended over a considerable part, and large numbers of protagonists celebrated the great religious festival in friendliness and non-aggression. In some parts of the front, British troops actually went into the German trenches, staying for some time and exchanging gifts of



Two views of the 'Christmas Truce' set-piece, both figures being basically firemen from the Airfix Dennis Fire Engine kit. Note the realistic bottle and mugs, all from scrap sprue.

food, tobacco, and so on with their German adversaries. After a day or so of such events, the war gradually took over again, and the phenomenon was not repeated at subsequent wartime Christmas seasons. The models show Tommy and Fritz who, having exchanged headgear and smokes, are enjoying a Yuletide 'drop of the good stuff'. The figures used in these conversions were taken from the Airfix kit of the 1914 Dennis Fire Engine, and other parts involved are one Rose Models metal head, and various oddments from the scrap-box.

Conversion 1

This is a British soldier seated, wearing a German pickelhaube, and with bottle and cigar. Figure needed for this is the Airfix fireman, driving, with Rose Models head GW11. Having trimmed all mould flash from the figure, cut off the head and drill out the neck to receive the spigot of the metal head (Fig 1). Now carve the boots to the shape of putteed legs, and cut in the collar opening and front flap of the overcoat (Fig 2). Next remove both arms, and re-set them, having taken off both hands at the wrists (Fig 3). The head is now Araldited to the figure, slightly turned to one side to give a more life-like appearance. Pieces of .01 inch plastic card are then cut as per Fig 4, and cemented in place to form the overcoat collar and flaps. Cut two pieces of strong

tissue paper, each 20 mm by 12 mm, and cement them to the figure as overcoat skirts (Fig 5). These are smeared with plastic solution, made by dissolving small pieces of sprue in liquid cement until a creamy consistency is obtained, and when thoroughly dried out they are trimmed to shape. A half-belt, shoulder straps, and pocket flaps are cut from .01 inch plastic card and fitted into place (Fig 6). Now sort out some suitable hands from the scrap-box, and having trimmed and fitted them to the arms, add a bottle and cigar, both made from scrap. Finally, make good all joints, smooth down, and undercoat ready for painting.

Conversion 2

This makes a German soldier seated wearing a British cap, and with raised mug. Figure required is the Airfix fireman seated with hands on his knees. Needed is the cap only from the Airfix Old Bill Bus figure. Head and right arm only come from the Airfix Programme Seller (Motor Racing Spectators).

Clean all flash from the fireman figure and remove the head, then carve the tunic to a single-breasted style (Fig 7), and trim the waist so as to eliminate the wide belt. Carefully cut off the right arm, and clean up any saw marks, etc, before replacing the arm with one cut from the Motor Racing Programme Seller, suitably raised (Fig 8). File the cap from the programme

seller's head, and flatten the crown at an angle. Then cement in place a cap cut from an Old Bill Bus figure (Fig 9). The head is then removed and fixed to the fireman figure, and following this a collar is fitted in the same way as for Conversion 1. Tissue paper coat skirts, smeared with plastic solution are next applied, and a half belt, and shoulder straps put on. A piece of sprue of suitable thickness is smoothed down and drilled out to make a cup, and this is cemented to the right hand, whilst a short length of pin or heat-stretched sprue makes a cigarette drooping from one corner of the mouth (Fig 10). Check that all steps have been carried out properly, and the figure is ready for undercoating.

These two figures, as can be seen from the photographs, are posed as if seated on wooden boxes, with a larger crate serving as a table, and for these items I used crates from the Merit OO Railway Accessories range. Needless to say, your Christmas Truce figures need not stop with these two, since it would be possible to make other figures, both seated and standing, using other suitable pieces finished in similar uniforms. The whole group, whether two figures or twenty, can be posed in a suitably scenic diorama, at its simplest, perhaps, a plastic ceiling tile. The Dennis Fire Engine can be used as a basis for an army lorry conversion and is not wasted.

Truck Conversions — from page 176

the axles finally set in place.

The body again is very simple. Remember to score the planking inside and outside the sides and ends, and also on the floor, add the runners down the sides, and the vertical posts from thick Microstrip. Finally, cement the five body bearers in place underneath and add the tool boxes and mudguards, etc, from plastikard.

Austin K6/ZB 6 x 4 Signals Van

Remove all running boards, tool boxes and fuel tank from the K6 chassis and replace with plastic card running boards slightly shorter than the originals and with the fuel tank nearer the front. An additional tank is required for the other side, which you will have spare if you are making the Guy or the K3. Make up the cab unit (parts 23 to 33) and assemble

to the modified chassis, axles, etc, as the kit instructions. Remember to paint inside the cab before fitting the roof, and add a disc of tissue paper over the ring or, if you wish, remove it and fill with plastic putty.

Make up the body as in the 'exploded' view, scoring in the panel and door lines and cutting out the windows before assembly. Start with the floor, add the inside support vertically to this, followed by the right side, the rear, the left side and finally the front. Do make certain it is nice and square, otherwise it will never sit right on the chassis. Add the cross-members underneath and the inside of the wheel arches as in the diagram showing the underside. Add the roof from 40 thou plastic card and the ventilators from the K3 Ambulance, the grilles from

scored 10 thou plastic. Cement the body to the chassis and fit the rear mudguards, and when it's all dry, finish painting.

With regard to the painting, as mentioned, it is a good plan to paint the insides and inaccessible places as you go along. The wheels in this kit are simple to do if you mount them on a wooden cocktail stick and turn them between your fingers. The centres can be painted while still on the sprue. For the tyres I always use a dark grey (the Panzer Grey in the Humbrol Military Vehicle set is about right) as matt black is too harsh.

Additional information on these vehicles is in *The Observers' Fighting Vehicles Directory*, by Bart H. Vanderveen, published by Warne & Co Ltd, and in various Bellona publications and their series of *Military Vehicle Data*.

Farnborough Colours, 1970

AN enjoyable aspect of 'Farnborough' always has been the riot of colour which the aircraft at the SBAC Display present when lined up for morning inspection. On close scrutiny many aircraft which show basically simple markings schemes often reveal small items of interest. It never ceases to be surprising how unexpected are the measurements of some of the letters and numbers now liberally applied.

The systematic visitor to the Show this year probably began at the Fokker F.27 Friendship PH-FPN in an assortment of orange, brown, grey and white, unusual, striking colours which also adorned the Fellowship PH-MOL. A very wide range of finishes is now possible for the Friendship.

There were two LTV A-7E Corsair IIs on show, both from VA-195 and similarly marked. They wore the usual US Navy Light Gull Grey (Federal Std Color No 36440) and Insignia White (Federal Std Color No 17875), upper areas matt, white under surfaces glossy. 156888 was in the flying display; 156889 static. Both came from the 'USS KITTY HAWK' proclaimed as their ship in 3 inch black letters on the rear fuselage. Their Navy Bureau serials were also black in 4 inch serials. 'NAVY' appeared on the rear fuselage in letters of an unlikely size—11½ inches wide and 15½ inches high. There was a wealth of detail to view on these aeroplanes, dominated by the white, green, and black bird's head motif on the tail outlined black, deep green and white rudder bars, green diagonal stripe outlined black encircling the forward fuselage, 'NH' on fin in black outlined white, green fin tip, white radome, white long-range tanks bearing a green tapering line, all-white tailplane apart from natural metal at its roots and adjacent fuselage areas, and all-white ailerons and flaps. 156888 had '401' on the nose in black outlined white. National insignia on the nose featured a 2½ inch wide outline.

Attracting much attention were three of the seven Jaguars. They were the British tactical single-seat aircraft S06 (XW560) in Dark Sea Grey/Dark Green/Light Aircraft Grey finish, with black serials and nose roundels. The French A03 single-seater was dark green and dark grey with silver under surfaces, wore 'D' in black on the intakes and a black 'A.03' on her fin. Standing amid an array of ordnance was Aeronavale's M05 single-seater in dark grey and white. If you model this latter type remember that the naval version has single main wheels and longer nose leg. It also has a stronger arrester hook. A point of detail concerning A03 is that standard wedge air intakes have been modified to take a simple pitot intake which has advantages in some flight regimes.

Four hundred Jaguars are on order for Britain and France and SEPECAT have contracts for the building of the first 80 aircraft comprising 25 Type E (two-seat trainers for France), 25 Type A, 15 Type S and 15 Type B (two-seat trainers for the RAF). First to be delivered, in 1971, will be the E Trainers. The French E.01, incidentally, features pale red-white-blue rudder striping. External variations amongst the Jaguars is not great and a family can easily be produced from the Airfix kit. But watch the camouflage



Top: Harrier 'D' of No 1 Sqn, XV792, shows her nose marking and fin code letter. Above: View of the Harrier T2 showing the red-blue fin flash and (barely visible) the upper wing roundel. The lower section of the tail unit appears camouflaged beneath the fuselage.

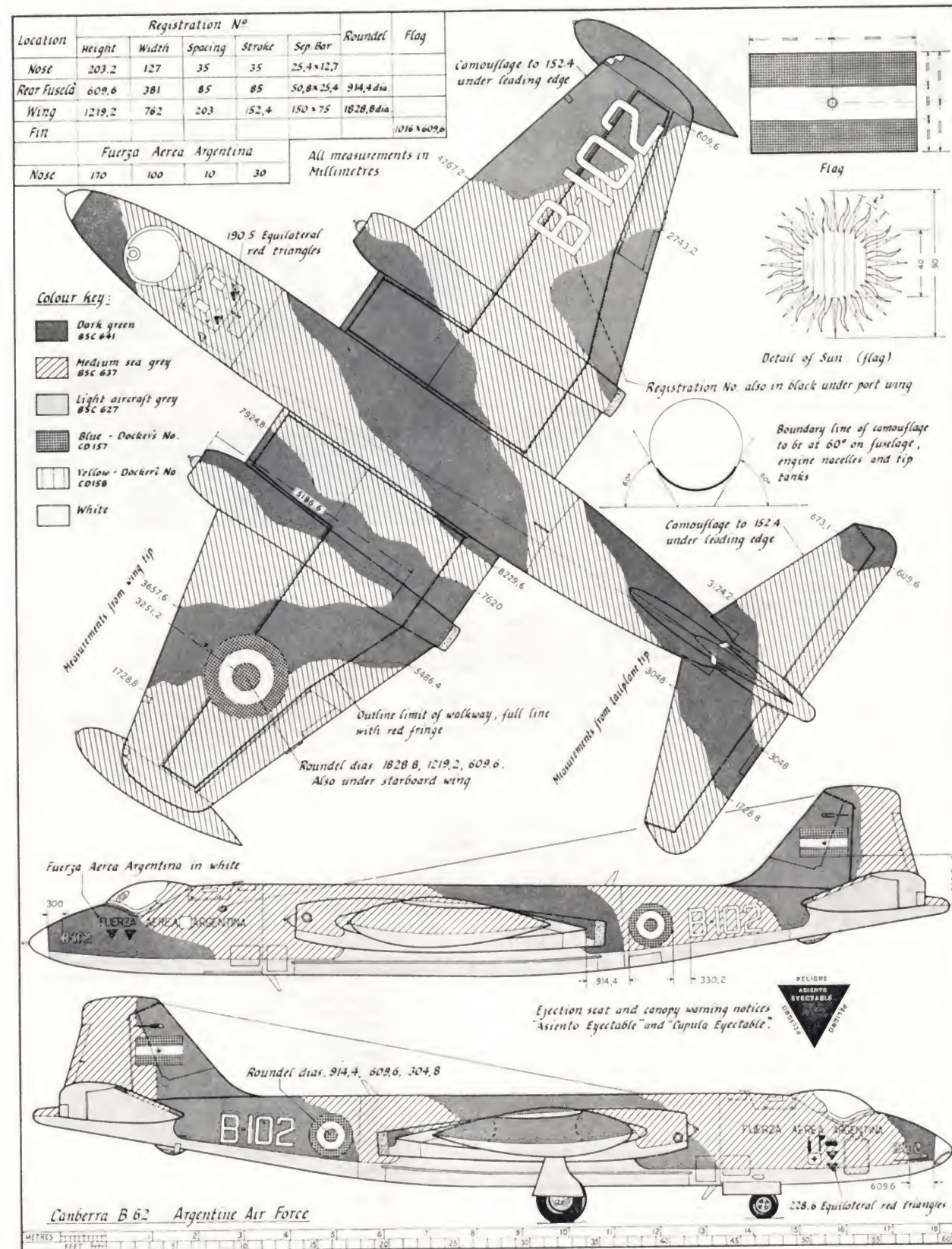
patterning—that on the French machines is quite different from the British.

Helicopters—despite the inconvenience of those rotor blades—make interesting models, for invariably they have detail worth adding. Wessex 5 XT486 apparently exhibited at Farnborough by 846 Sqn wore a dark green shade overall, a special operational finish the Navy uses. Legends appeared mainly white, some yellow. Both Sea Kings wore that 'blue-grey' overall finish described by Alan Hall in our January 1970 issue, and again had basically white trim. XV666 was the most interesting. She had the customary 4 inch serials of naval aircraft and '144' 12 inches high in 1½ inch wide strokes on the port side of the nose. '4' appeared on the front of the nose in white, and '44' in 3 foot digits amidships. A white 'E' was painted on the tail rotor boom. A new feature was the white sea horse, 826 Squadron's motif, on the forward starboard side of the fuselage. Like the Sea King, the Wasp XS570 had 4 inch serials and 'ROYAL NAVY' in 10 inch letters. Westland's S.A.330 Puma appeared with dark green-dark grey-light grey finish, but with roundels of an unusual pale shade.

In our September 1969 issue we illustrated the paint scheme for the RAF Buccaneer, based on the HS drawings for the aircraft. XV350, an AAEE and maker's trials aircraft, wore this scheme, an interesting item being the unpainted areas on the leading edges of the wings and tailplane. Warm air from the blower system would cause trouble with any paint on these parts. Where the cockpit framing is bonded to the canopy there appears a pale green stripe—it is marked uncoloured on the original

Continued on page 214

Right: One of the most interesting aircraft shown at the SBAC Display was this Canberra destined for the Argentine Air Force. Alf Alderson has based his drawing upon details very kindly supplied by the British Aircraft Corporation Ltd. The camouflage pattern is basically that applied to RAF Canberras. Our drawing has been simplified from the original works drawings where many small stencillings appear, too small for a model. On the nose the fire axe, extinguisher and asbestos glove are red. A red Greek cross appears on a white square. Ahead of the nose entry door the squadron crest will be painted on a white square. External finishing of the aircraft calls for nine operations: masking off some areas, degreasing, priming, stopping river holes, two primer fillings, three colouring coats, with paint to Spec DL5628 suitably thinned. All finish glossy, with the division between upper and lower surfaces allowing a one inch overlap at boundary line. Rudder, elevators and ailerons receive special treatment in finishing. Internally the cowlings, engine bays, jet pipes, inner surfaces of wings in flap areas, upper surfaces of the flaps, jet pipe rear cones, fuel tank bays 1 to 3, undercarriage bays and fairings and the bomb bay have a finish of silver to DTD899A. Interior surfaces of air brakes that can be seen when fully extended are painted with red lacquer. A general feature of more than passing interest is the use of millimetres for all measurements in many cases direct conversions from English Linear Measure. Just what problems this poses are well indicated here; multiplied on a national scale one cannot but cry 'Lunacy'. Why, it could even bring an end to our dear old 1:72 scale!



Above: The Argentine Canberra as drawn opposite; a larger top view appeared on page 118 in our November issue.

Fire Control

A GUIDE FOR MODELLERS OF BRITISH WARSHIPS,
MAINLY 1939-45 PERIOD

by Peter Hodges

IN the early 1930s, development began on an AA fire control system suitable for small ship installation: for there was an increasingly urgent requirement to provide Fleet destroyers—in particular—with a means of defending themselves using their main armament in predicted fire. None of the pre-war destroyer classes, up to and including the 'I' boats, were able to do this and they could only use their 4.7 inch guns in a form of deterrent barrage fire. The provision of an effective system was hampered to an extent by the low maximum elevation of these weapons, so that the problem was two-fold: and even after the small-ship system had come into service, the gun mounting elevation headache remained with the designers for many years.

The Fuze-Keeping Clock and Associated Equipment

The system consisted of a lightweight, open director similar in many ways to the early HACS director: a calculator called the Fuze Keeping Clock—or 'FKC'—and a separate calculator for surface fire control.

The FKC worked on the same principles as the larger HACS Table and made the same assumptions regarding the target's course and speed. Unlike its big brother, however, it only calculated the special corrections for AA control (which were combined with the basic inputs to the associated surface calculator) and was therefore not a fully self-contained device.

The prototype installation was fitted experimentally in the sloop *Fleetwood* and the first production models were ready for the 'Tribal' class destroyers. In this class, the earlier open rangefinder was replaced by the new 'Rangefinder Director' in a similar position, abaft and above the DCT. In surface fire it functioned simply as a rangefinder but in AA it became a director in its own right.

The accelerating ship-building programme outpaced the production of this director, so unfortunately the 'J', 'K', and 'N' classes had to revert to the original simple rangefinder, but this was specially modified so that it could also be used against aircraft targets. Thereafter, the bulk of the destroyers built under the Emergency Programme had the standard 'Tribal' layout.

Rangefinder Directors

Mk I: This was the experimental model already mentioned and was associated with prototype Fire Control calculators for both surface and AA fire. These were the FKC and the Fire Control Box—the latter, a miniature version of the Admiralty Fire Control Clock which had been the standard surface calculator in destroyers for some years.

Mk II and Mk III: These two marks were developed from the Mk I but had electrical transmission arrangements. The Mk II was designed for destroyer fitting, while the Mk III was a dual-purpose director used in conjunction with the twin 4 inch HA guns in sloops and certain other vessels. When thus employed, an extra crew member was required and in consequence, the Mk III was slightly larger and carried a crew of five.

Both directors were hand-operated through two-speed gear-boxes for the layer and the trainer, the fast speed being used to slew the director on to the target. The Control Officer had his own auxiliary handwheels but these were normally de-clutched to prevent them from back-driving when the director was under the normal control of the layer and trainer.

Mk II(W) and Mk III(W): The first models had been completely open mountings but it quickly became clear that more protection was needed for the crew. A drum-shaped wind shield was therefore added and all future production models conformed to this pattern, then having a suffix 'W' added to the mark



HMS Norfolk in 1945. A veteran of the Bismark and the Scharnhorst actions, she was chosen to convey King Haakon back to Norway after his war-time exile in UK. Many of the equipments discussed in this series can be seen in the photograph. 'X' turret has been replaced by a pair of 'quad' pom-poms, with sided directors abaft the tripod mainmast. Superimposed above them is 'Y' turret's Barrage Director. Forward of the mast is the 8 inch Director Tower and a Height Finder Radar in the old HACS Director position. There is a pom-pom director for the starboard 8-barrel weapon just outboard of the 8 inch DT and the starboard director of the revised HACS layout is visible abreast the bridge superstructure.

number.

As the war progressed, certain technical improvements were made including the addition of the familiar radar aerial array, but otherwise the appearance of the directors remained unchanged. All Mk II and Mk III variants were linked to the AFCC-FKC calculator-combination.

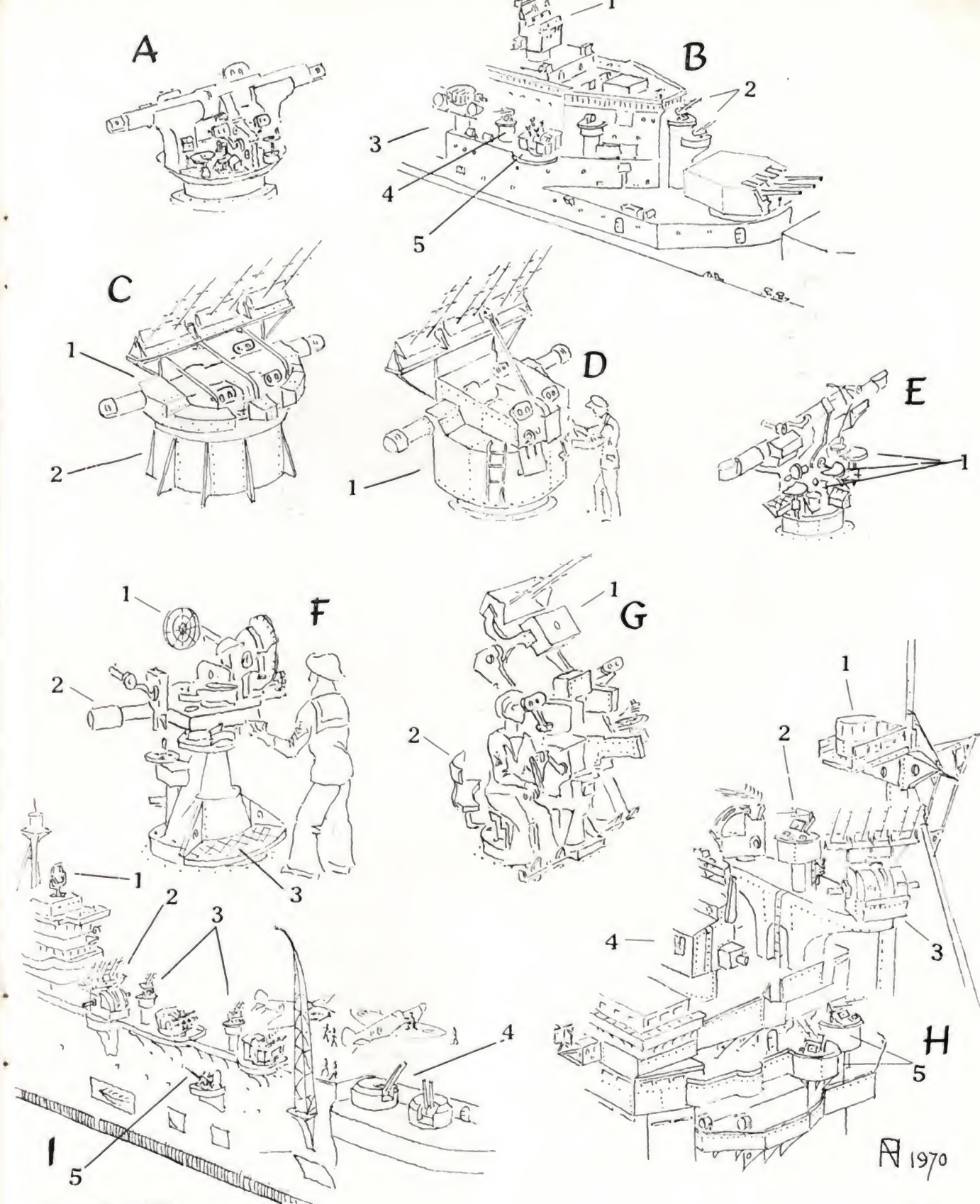
Mk IV and Mk V Series: These were very similar, except that their positional transmissions were conveyed to the compartment housing the calculators, by mechanical shafting. The Transmitting Station was thus immediately below the director and although this somewhat simplified the initial installation, it had the demerit of placing the TS in a more vulnerable position than was the usual practice.

The Mk IV and Mk V, like the other marks, were open in the first instance, but were later modified to take a windshield.

Continued on page 186

Key to fire control equipment drawings shown opposite:

(A) Original Rangefinder Director Mk II. (B) General view of the forward superstructure on HMS Swiftsure: (1) 6 inch DCT; (2) Barrage directors for 'A' and 'B' turrets; (3) Starboard HA/LA Director Mk VI; (4) Pom-pom Director; (5) Starboard 'Quad' pom-pom. (C) Rangefinder Director Mk V*: (1) Rotating windscreen; (2) Fixed casing. (D) Rangefinder Director Mk III(W): (1) Fully rotating windscreen. (E) Modified 'Three-Man Rangefinder': (1) Crew seats. (F) Pom-pom Director Mk II: (1) Control Officer's sight; (2) Rangefinder; (3) CO's platform. (G) Pom-pom Director Mk IV: (1) Gyro unit; (2) Bench seat for additional crew members. (H) Main superstructure of HMS Howe: (1) Surface Warning Radar; (2) Pom-pom director for 8-barrelled pom-pom on 'B' turret; (3) Port forward HA/LA Director Mk V; (4) Forward 14 inch DCT; (5) Pom-pom directors for 8-barrelled pom-poms abreast fore funnel. (I) Fleet carrier: (1) Height-finder radar; (2) Starboard forward HA/LA Director Mk V; (3) Pom-pom directors; (4) Starboard forward 4.5 inch battery; (5) Single 40 mm Bofors.



Previous articles on this subject appeared in the June and September 1970 issues.

Fire Control—continued

shown by an asterisk added to the mark number. Internal structural differences from the Mk II and the Mk III made it difficult to mount the windshield on the rotating director base; instead, a fixed casing was provided, on which a ring-shaped extension—itsself connected to the moving base—revolved. The training and elevating gearing was similar to the previous marks but power stabilisation was added in the elevation drives to the sights and rangefinder.

Mk VI: This director (NOT to be confused with the much larger HA/LA Director Mk VI) was the logical successor to the earlier 'mechanical transmissions' types and incorporated features from these as well as having a rotating windshield like the Mk II and Mk III. The Control Officer's position had a 'scooter' unit from which he could control the director's elevation and training in power follow; and the rear of the director was plated-in up to the radar aerial array. These additions almost doubled the all-up weight which rose to about three tons.

The Mk VI versions were rebuilds of existing Mk Vs and were mostly fitted to the later groups of 'Hunt' class destroyers and to 'Bay' class frigates when these ships underwent their normal refits after the war.

The Mk IV, Mk V and Mk VI Rangefinder Directors always controlled the armament through the FKC/FCB combination, and, except for the 'O' and 'P' class destroyers, were invariably associated with twin 4 inch HA mountings.

Destroyer Installations

The TS in destroyers was already comparatively deep within the hull which made the transmission of director movements of elevation and training impossible other than by the electrical 'repeater' system already described. On the whole, the full capabilities of the FKC were rather wasted in the Fleet destroyers because their 4.7 inch mountings were so limited in maximum elevation. Nevertheless, it did give them the much-needed ability to use their main armament for as long as it was able to bear on the target. In many of the bigger Fleet destroyers, a high-angle 4 inch gun was added—at the expense of the torpedo armament—and in the 'Tribals' the twin 4.7 inch in 'X' position was replaced by the faithful twin 4 inch HA. When so armed, a special 'conversion' device was incorporated in the Fire Control system to enable guns of a different calibre to be employed at the same time; and the 4 inch could continue to engage targets when the 4.7s had reached their upper elevation limit.

Towards the end of the Emergency Programme, the long-established Destroyer DCT was phased out, and as an interim measure, before the new generation of HA/LA directors were available for fitting, the 'W' class ships were given a Mk III(W) director which fulfilled a dual-purpose role.

Other Rangefinder Director Applications

The accompanying table shows that the system was not limited to 'small ships' alone but was fitted elsewhere, especially where space or fitting-out time were at a premium. Indeed, when the complicated HACS was itself phased out towards the end of the war, its large calculator was replaced by the FKC, although the 'big ship' style HA directors were retained (see the early instalment in the June 1970 issue for details).

Close Range Weapon Directors

The advantages of the director principle were equally applicable to close range weapons and well before 1939, a lightweight, open director was designed to control the big eight-barrelled 2 pdr pom-pom mounting with which all capital ships, aircraft carriers and the later classes of 8 inch cruisers were equipped.

This weapon, it will be remembered, was installed to defend the parent ship from attacks by low-flying torpedo bombers which, of necessity, needed to approach closely before releasing their 'tin-fish'.

Torpedo bombers usually carried out a good deal of 'ducking-and-weaving' before finally settling on their attack run, so the pom-pom mounting needed to be highly mobile in its elevation and training. Each of the eight barrels had a rate of fire of the



Close-up view of a Mk II(W) R/F Director in HMS Virago. Notice the servicing platform attached to the tall pedestal (P. A. Vicary). HMS Apollo, with a Mk III(W) R/F Director for her twin 4 inch gun mountings ('Navy News' postcard series—prints available from 'Navy News', RN Barracks, Portsmouth at 1s 6d each).

DIRECTOR INSTALLATIONS			
Mark	Ship/Class	Remarks	
I	Fleetwood	Prototype	
II or	'Tribal' class, 'Q', 'R', 'S',	In association with	
II (W)	'T', 'U' and 'V' class	'Destroyer DCT'	
	destroyers		
III or	'W' class destroyers	Interim arrangement	
III (W)	'Black Swan' and Modified	Eg, Starling, Amethyst, etc.	
	'Black Swan' class sloops		
	Some early sloops		
	Fast minelayers		
	Unicorn	Eg, Stork, Egret	
IV, V	'O' and 'P' class	Eg, Ariadne, Apollo, etc.	
or VI	destroyers	Three directors on the 'island'	
series		Interim arrangement at	
		commencement of	
		Emergency programme	
		Replaced original Pedestal	
		Director	
	Some early destroyers	Mk VI post war	
	converted to Escorts	Mk VI post war	
	'Hunt' class destroyers	Fitted for 4 inch armament on	
	'Bay' class frigates	Emergency modernisation	
	Frobisher (2)	Mostly 'ended' systems	
	Hawkins (1)		
	Some destroyer Depot ships:		
	Repair ships: Auxiliary		
	AA ships		
IV or V	Erebus	'Sided' for 4 inch armament;	
series	Roberts	15 inch Aloft Director used	
	Abercrombie	for 15 inch turret	
V	Gurkha (ex-Larne)	Controlled extemporary	
	Legion	armament of 4 X twin 4 inch	
	Lance	HA fitted in place of designed	
	Lively	3 X twin 4.7 inch	
	'J', 'K' and 'N' class	Adapted from an existing	
Modified	destroyers	LA Rangefinder	
3-Man			
Range-			
finder			

order of 100 rounds per minute and the smoke and noise distraction to an on-mounting layer and trainer can be imagined. Further, their ability to 'change target' in the heat of an engagement might lose precious seconds. To comply with the usual Naval axiom of taking 'seamanlike precautions', local sights were also fitted to the mountings themselves, so that they could be aimed independently if necessary.

The eight-barrelled 'Chicago Piano' (as this pom-pom was nicknamed) was too large for general fitting throughout the Fleet but the need for a similar weapon for smaller warships was clear. A lighter, four-barrelled version was therefore produced and was installed in many classes, ranging from the 'Black Swan' class

Right: HMS Paladin was among the earliest of the 'Emergencies' and had a Mk IV* R/F Director low-set on her bridge. Notice the make-shift armament of old 4 inch HA guns, all stowed muzzle-forward.



frigates, through to the big ships, where it supplemented the eight-barrelled version.

In ships where space (and crew) considerations were not pressing, the 'Quads' were also director-controlled; but in destroyers and below, the mountings could only be controlled from their own gun-sights, despite frantic juggling by their designers, who were always being invited to put a quart into a pint pot.

This small-ship problem led to the development of the fully-automatic radar-controlled close range weapons which will be described in detail in a future article.

The Pom-pom Director

Like most comparable equipments, the director started its life as a simple sight but as time elapsed, it became more complex and moved from the Mk I to the Mk IV, with the usual sprinkling of sub-models. The Mk II and III series were already in service at the beginning of the war and had a crew of five. The range-taker had a seat in the front of the director, behind his rangefinder, and the CO (Control Officer) stood on a platform in the rear, but the other crew members 'walked' round the rotating structure as it trained. In the later Mk IV, all had on-mounting seats.

All models were open: the layer and trainer tracked the target in the usual way; and the Control Officer (who fired the guns) had a separate sight. This was capable of independent movement and in the Mk II took the form of a conventional 'cartwheel' sight of concentric rings supported by radial 'spokes'. The sight rings represented aircraft speed in knots and by aligning the appropriate speed ring to the target—rather than the centre of the sight—the 'aim-off' was determined. This extra movement was added differentially to the initial tracking of the layer and trainer and the gun mounting electrical receivers registered the combined angles. The small rangefinder carried in the forward part of the director fed a measure of the target's present range into the calculating mechanisms, which also had a wind-speed and wind-direction input so that the director was in many ways its own Fire Control calculator.

Altogether, it was quite a practical arrangement because the director layer and trainer had only to bother with accurately tracking the target, while the Control Officer had only to concentrate on his task of applying the 'aim-off'. However, this was no easy matter and the point of aim was subject to the CO's estimation of the target speed. Thus, the accuracy of the fire ultimately relied on his ability and experience.

The difficulty was much alleviated by the addition of a gyroscope in the Mk III and Mk IV directors which automatically calculated the correct deflection; and by this time a radar aerial had been added as the primary range-measuring device. Meanwhile, the pom-pom mountings themselves had been adapted for Remote Power Control: the major proportion of the 'human error' had been removed; and they could pump out a well-directed and withering hail of fire. It must have taken a cool nerve indeed to fly unflinchingly towards the muzzles of a 'Chicago Piano' which was delivering a total of something like 800 rounds of HE 2 pdr high velocity shell per minute.

Because the director also acted as its own Fire Control Calculator, it paved the way towards the completely self-contained close-range mounting, and by incorporating the range-measuring and deflection-calculating devices on to the weapon itself, these ends were later achieved.

Each four-barrelled or eight-barrelled mounting had its own

director, and later, this principle was applied to some twin 40 mm Bofors mountings, but no single-barrelled close-range weapons of any calibre were director-controlled.

Other nations were adopting the same control principles, and most RN ships which were refitted in the United States during World War 2 emerged with American Bofors mountings controlled by their own close-range directors. Unlike the British, the Americans produced a 'quad' Bofors whose barrels were arranged in two pairs in a rectangular shaped mounting. HMS Nelson had a North American face-lift during the war, and returned to service with four of these US quads. They are parts 71, 75, 103 and 106 of the Airfix kit, and are quite well modelled. On part 102 the two short stubs represent the Bofors directors but care should be taken when positioning this platform. Its proper location is seen on the box lid, making the profile on drawing 4 of the instructions incorrect, where it is shown on top of the bridge superstructure.

Some British warships were fitted with an American pattern twin Bofors mounting, and this, too, was sometimes controlled from its own lightweight director.

Barrage Directors

Before World War 2, a calculator was designed to enable the main armament of 8 inch cruisers and the 6 inch armament of Nelson and Rodney to augment the anti-aircraft fire of their AA weapons. It was known as the Augmenting Table and was mentioned in the first part of this series (June 1970).

The need for this device did not arise in the 'King George V' class battleships because they already had a substantial HA/LA secondary armament; neither was it justified in the classes of light 6 inch cruisers which followed the 'County' class ships.

The idea of using the main armament for AA fire re-emerged in the triple 6 inch gun cruisers, but a simpler method was evolved employing a compact Barrage Director. This was very similar in appearance to the Pom-pom director, and the earliest units were in fact converted close-range equipments. They were fitted to many of the 'Colony' class cruisers and also to some of the 'County' class, as can be seen by the photograph of Norfolk.

The comparatively slow rate of fire of guns of 6 inch and 8 inch calibre precluded their use as AA weapons in the normal sense, but their long range and great destructive power made them ideal as a means of breaking up formations outside the range capabilities of the conventional anti-aircraft weapons.

When the main armament was to be used in the AA role, the individual turrets were linked to their respective Barrage Director via a circuit change-over switch, and were entirely under its control. The guns were loaded with time-fused shells set to explode at a predetermined range, and the mounting followed its Barrage Director in training and elevation.

Like its Pom-pom Director cousin, the Barrage Director had a built-in prediction system, but in addition it worked through a radar unit through which the firing circuits to the guns passed. The radar aerial on the Director produced a continuous measure of the target's range, and when this reached a certain level, the guns fired automatically to suit the pre-set timed fuse set on their shells.

The degree of accuracy necessary for normal predicted AA fire was not so urgent because of the large destructive effect of 6 inch and 8 inch shell, and the scheme was effective against formations of both high level and torpedo bombers (because

Continued on page 198

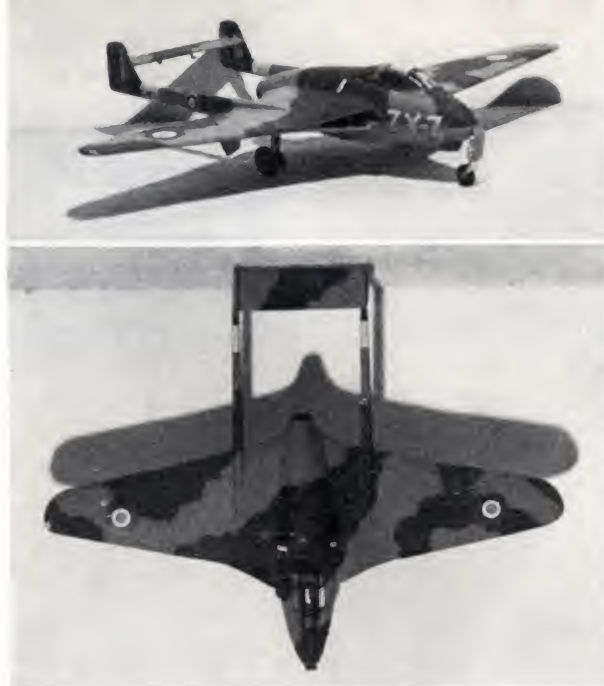
A project for conversion addicts

By Derek L. Whiting

I chose the earlier version, as this was actually built during the war years, but of course the modeller can choose whichever version appeals most. Both types are shown on the drawings. The basis of this conversion is the Airfix Armstrong Whitworth 'Sea Hawk' kit which, apart from a similar forward fuselage and wing root intakes, bears little resemblance to the Vampire. It does, however, have a wing shape which can be fairly easily altered: also the undercarriage and cockpit cover can be used after little alteration.

Smear cement round the nose area and build up with Brummer. File and sand to the new shape when set hard. Re-shape the cockpit canopy by filing the flat panels for the windscreen, and if you have elected to model the three-piece style, this can now be filed and sanded to shape. Restore the transparency with metal polish. If you prefer working in wood, the existing nose will have to be cut off and replaced with a block of wood. Fit the canopy temporarily with just a touch of cement. Build up the area around the windscreen with Stopping and when dry, file and sand to shape.

Assemble wings as per kit instructions and leave to dry out, then cut the jet pipes off together with the rear section of wing centre section. Cut off the leading edges from the intake apertures (check all these angles by laying the Sea Hawk wing over the Vampire plan), re-shape the tips after first cutting a section from the wing trailing edge in the aileron area (again reference to drawing will show where), then file and sand to airfoil section.

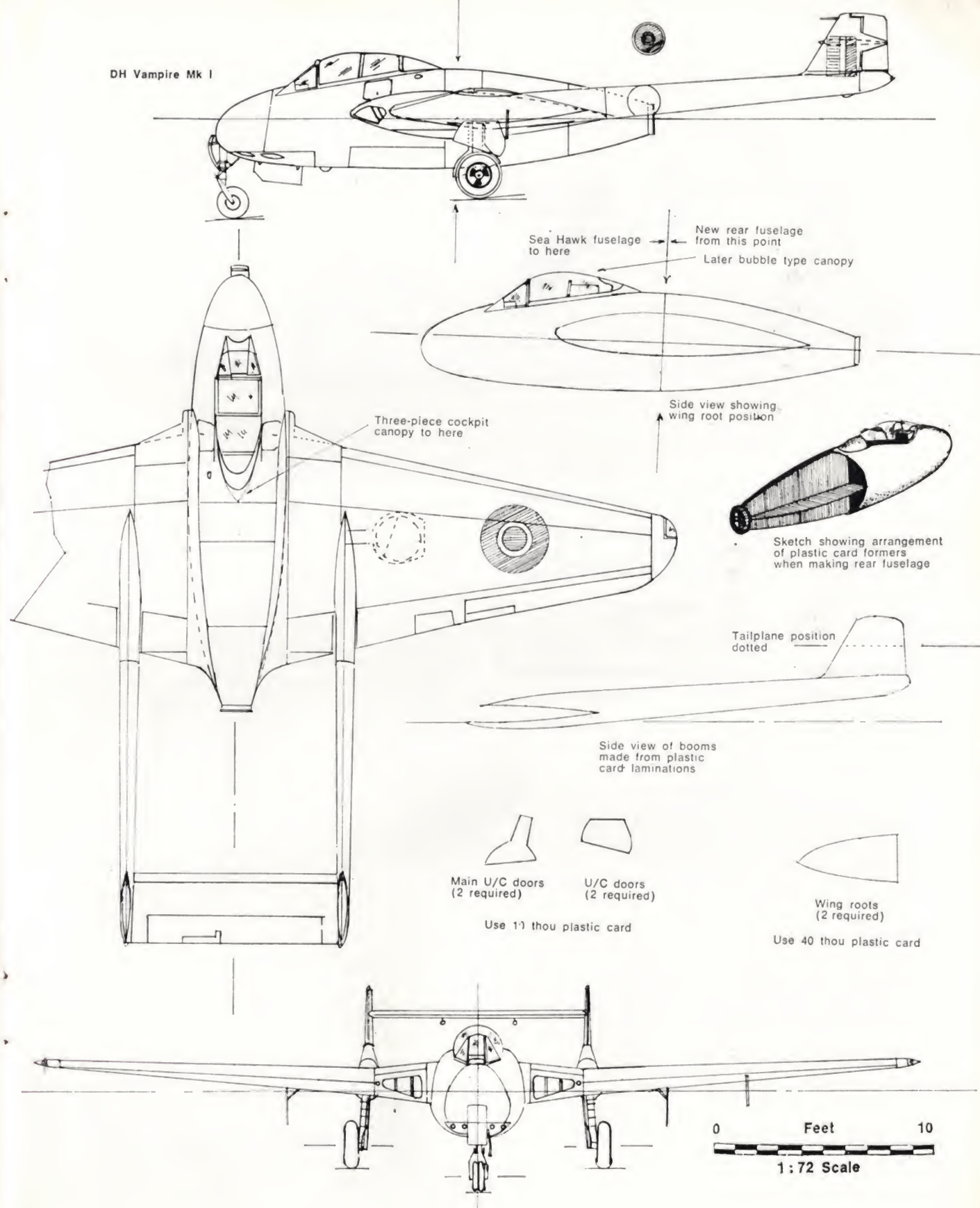


Fill existing aileron outlines with Stopping or body putty after running a little liquid cement along the grooves. Sand flush when dry, and then etch-in the new aileron outline using a straight-edge and the point of a needle file. Cut a piece of 30 thou plastic to fit the gap in the rear of the wing, obtaining the shape from the drawing.

The two tail booms come next. These are cut from plastic card laminated together to the correct width. The two centre laminates are cut with the fin/rudder integral. File and sand to shape. It is advisable to make the wing cut-out a little smaller than shown, and then carefully file and sand a small amount at a time until a snug fit is obtained on the wing. Make and shape a new tailplane from plastic, etching in the elevator outlines. Cement the booms in place on the wings, and before the cement has set, add the tailplane. Check that everything is aligned and leave to set hard. Fill any gaps and joints, smooth with 0400. Carefully lift off the canopy and give a final polish before fitting permanently in place.

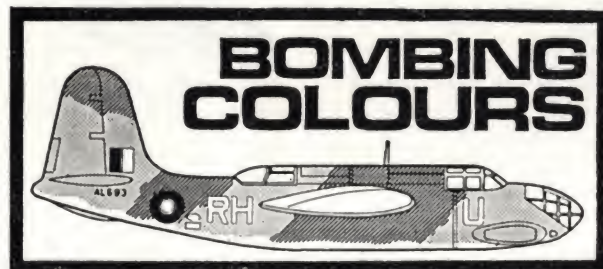
The cannon blast-troughs can now be etched in, again using the point of a needle file. A small hole is bored to take the front undercarriage leg (if Stopping has been used, a needle file spun between the fingers is better than a drill and should prevent the

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Wellington 1s of No 9 Squadron. They exhibit an interesting array of markings. L4274 KA-K nearest had Type A under-wing roundels. L4288 has yet to acquire these, and beneath her Type B fuselage roundels can be seen clear traces of the previous type. L4279 KA-D is without under-wing roundels, whereas L4320 KA-Z/B (Z denoting this to be the second 'B' on strength) has codes alongside Type A1 roundels. L4320 was used on the first raid of the war by Wellingtons and crashed 8.9.39 (Imperial War Museum).



Part 21: Wellington and Hampden

NOWADAYS it is customary for the design stage of a major military aircraft to span as much as a decade—which means that the basic concept needs to correspond with requirements a great time ahead. Thus the new Nimrod, culmination of years of consideration, needs to be suitable for front line service in the 1980s. This, of course, was less true in the past, although such a trend was appearing in the 1930s. Then the Ministry was looking some five or six years ahead. Once the mould for a new project has been cast it is, and always will be, difficult and time consuming to radically alter it. This was true of bomber specification B.9/32, one of the most important of all, which was nevertheless basically changed after it was first promulgated.

In October 1931, requirements were formulated for a bomber to ultimately replace new biplane heavies and the Sidstrand/Overstrand series. It was to be a high-performance long-range twin-engined monoplane carrying a goodly load at high speed. And before details of the specification were circulated, plans were agreed for a single-engined equivalent, the P.27/32 which evolved as the luckless Fairey Battle.

B.9/32 was put out to tender in October 1932. Resultant schemes were delivered from Vickers, Handley Page, Gloster and Bristol in February 1933. All were radically different designs and, following the tender conference of May 29, 1933, the Vickers and Handley Page designs were accepted. In September the firms were told to proceed with prototypes.

There was one feature of the specification which displeased the manufacturers. It prescribed an empty airframe weight of

6,000 lb, thus severely limiting the designs, particularly where the choice of engines and fuel load was concerned. In the chosen prototypes these were to be Rolls-Royce Goshawks, with the Bristol Pegasus as an alternative.

A 6,000 lb basic weight was the top limit laid down for bomber aircraft by the Geneva Disarmament Convention, but by 1934 the British Government was aware that other powers were not keeping to the agreement. Therefore the way was clear for heavier, larger British aircraft, and in the summer of 1934 Britain, too, reluctantly disregarded the agreement. Vickers and Handley Page could now proceed on a better basis. Both companies chose more powerful engines, submitting plans for machines powered by Pegasus or Perseus radials. These changes delayed the designs, but in both cases led to much superior aeroplanes.

Once the weight ban was lifted, the Ministry, too, began to think along other lines and issued a new specification for a heavier bomber, B.1/35, which attracted many projects and threw a shadow over B.9/32. The latter was well under way, proceeded, and in 1936—by which time major re-armament schemes were in being—had assumed great importance. Both chosen designs were, under Scheme F, to form the backbone of the new Bomber Command. In June 1936, prototypes of each made their first flights, the Vickers machine on 15th and the HP 52 five days later. Four and a half crowded years had elapsed since the original plans were laid for them.

K4049, the Vickers B.9/32, Pegasus powered and in all-silver finish with Type A roundels and far removed from the original design which featured a high wing and fixed

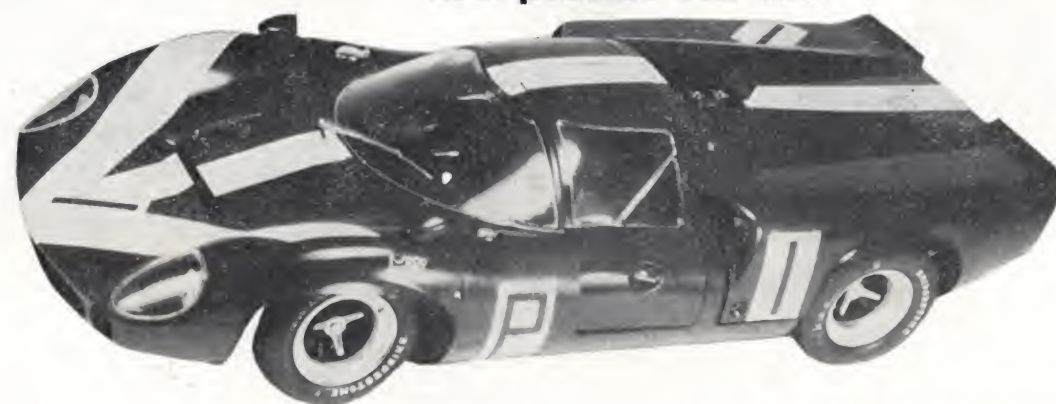
Continued on page 196

The Handley Page Hampden prototype, K4320, showing how much it differed from the production machine, and how slender was its fuselage. On production machines the outer mainplane had marked dihedral. There are open slots on the wing leading edge (Flight International).

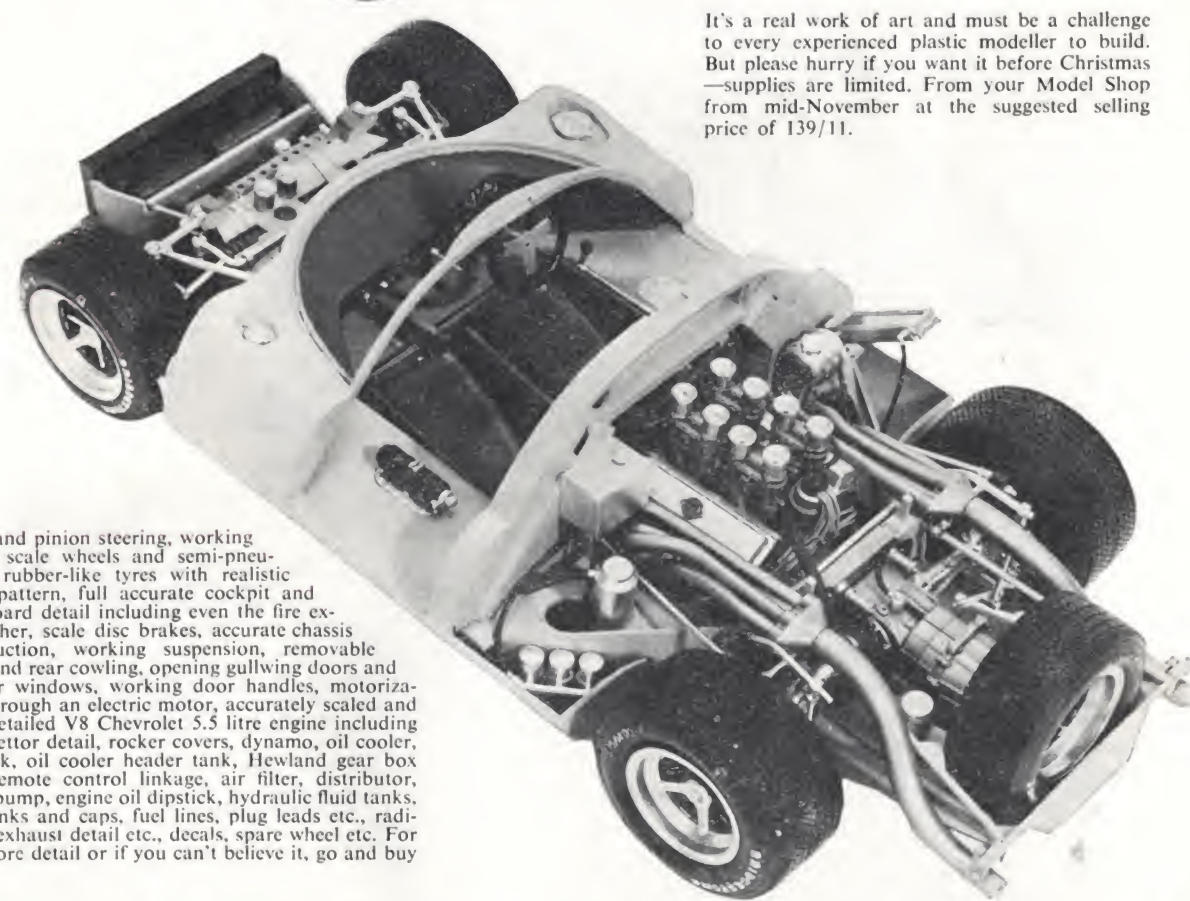


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Top Left: A Tiger and Jagd Panther advance with German infantry.

Top Centre: Two Shermans at rest with US Army tank crew figures.

Top Right: A Jagd Panther with tank crew (available as extras in the Tamiya range) with the only non-Tamiya model. The intruder in these pages is the 1/35th Hanomag SD KFZ 251/1 Half Track manufactured by NITTO, distributed in England as a Riko Kit.

Right: Tamiya's Russian T-34 tank.

Below Right: Hasty orders for the crews of a 'Schwimmwagen' amphibious jeep and a Tiger. Additional tank crew figures have been used for this picture.

Below Centre: The new Tamiya 1/35th scale British six pounder Anti-Tank Gun complete with crew shown in action in front of a burnt-out Rommel, also built from a Tamiya kit.

Below Left: The Tamiya 1/35th scale Panther with German infantry figures.

Left: The Russian SU 100/85, one of Tamiya's most authentic models.



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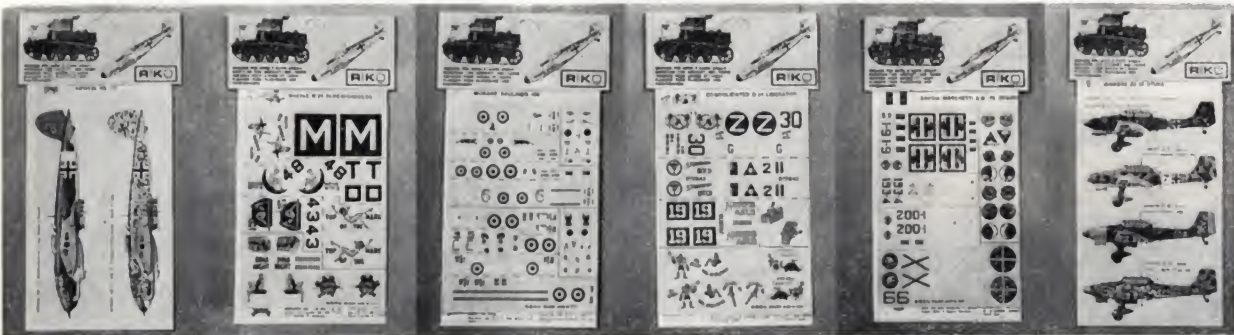
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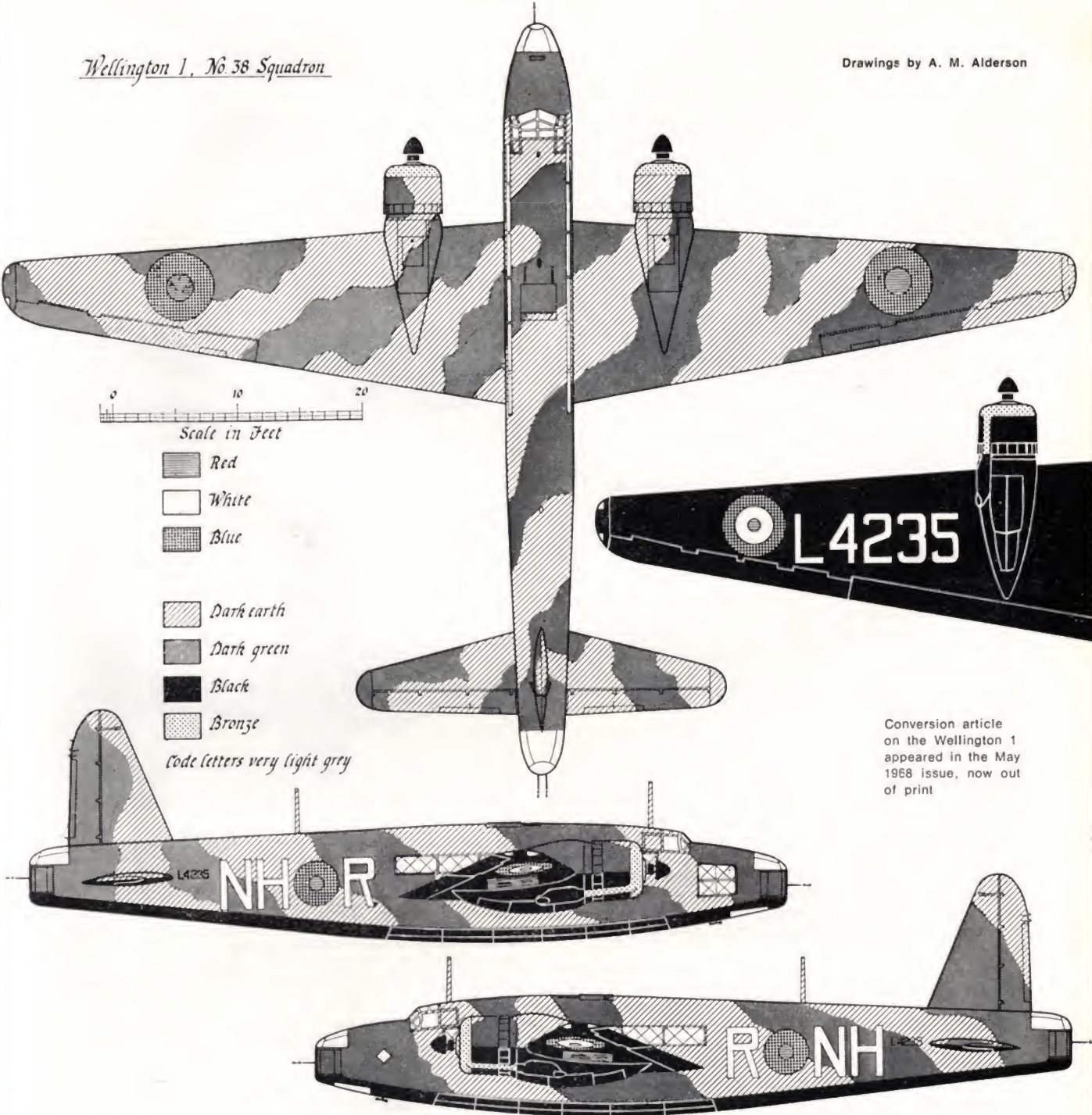
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Wellington 1, No 38 Squadron

Drawings by A. M. Alderson



Conversion article on the Wellington 1 appeared in the May 1968 issue, now out of print

Above: Wellington 1 L4235 in her original squadron finish, with unusually large diameter fuselage roundels, very pale grey codes and under wing roundels. Above the wings the Wellington 1s originally had 63 inch diameter roundels with four foot wing serials. Fuselage Type A1 roundels were 49 inches in diameter. The under wing roundel Type A was of 60 inches diameter. The Hampden had Type A1 fuselage roundels of 35 inches diameter, those above the wings were 63 inches. Code letters seem to have been about two feet high, whereas on the Wellington they appear to have been 4 ft and sometimes slightly larger—possibly 4 ft 6 in. Right: Wellington 1 L4280 in original factory finish prior to delivery (Flight International).



Bombing Colours — continued

undercarriage, was seen to be a graceful machine with long tapering wings akin to those of the Wellesley. It had another feature in common—it was of geodetic construction composed of criss-cross strong metal members devised by the ever-ingenious B. N. Wallis. It was this feature as much as any that, since 1933, had allowed the load and range of the design to be much increased.

K4240, the Handley Page B.9/32, emerged as a much more curious machine, and in quite a horrid shade of dirty green. It had little in common with the Vickers aircraft, apart from its engines. The wing was massive and greatly tapered, but the astonishing feature was a slender boom upon which dangled the tail unit after the manner of the earlier HP 47 whose layout was to a certain extent reflected in the HP 52. This had been introduced to the company by Dr G. V. Lachmann, its German influence stemming from work which the Messerschmitt company had undertaken, and which was to some extent reflected in the Messerschmitt 110 and the Dornier 17. It proved an unfortunate decision to adopt an extremely slender and cramped forward fuselage deep in side elevation and terminating amidships in dorsal and ventral gun positions. The narrow fuselage with its belly bomb bay permitted virtually no increase in weapons load and restricted the addition of special equipment.

On August 15, 1936, two months later from the day when the Vickers bomber flew, the Ministry placed contracts with the two firms each for 180 aircraft (for the Vickers 29/36 L4212-4391 and the HP 30/36 L4032-L4211 production versions) under Scheme F, with an additional 100 of each to be built in shadow factories. In the case of the Vickers aircraft this was to be done by Gloster, but in the event the aircraft came from a new Vickers factory at Chester. Fearing a possible bottleneck in the building of Bristol Pegasus engines (now in great demand) it was decided that the shadow factory building the Handley Page design should fit Napier Dagger engines into the aircraft, L6002-6101. Into the shadow built Vickers machines could go the Merlin X. Thus the HP Hereford and the Wellington Mk II were originated.

In September, both the B.9/32 types were named, the Vickers aircraft becoming the Wellington and the HP 52 the Hampden. When they rolled from the production lines both types were to differ considerably from their prototypes. These latter were accepted for official trials at Martlesham in November 1936. In performance they differed surprisingly little.

Already modern gun turrets were at hand, which neither machine had, although the Vickers B.9/32 had been fitted with a rudimentary nose and tail type. The Ministry now wanted effective turrets installed in the nose and tail of the Wellington, which necessitated redesign and alteration to the rear fuselage which was deepened and its waisting discarded. In the case of the Hampden it was clear that no power-operated turret could easily be fitted, a seemingly unfortunate event. The planned fixed nose gun was considered to be of little value, and it was realised that dorsal and ventral guns would have only limited traverse. At Martlesham the accommodation was considered cramped, and it was seen to be well nigh impossible for the crew to exchange positions. But the view for the pilot was excellent and on the second prototype L7271 which, in natural finish, appeared in 1937, the nose transparency was much enlarged. The Hampden's performance was considered good, and another point in its favour was a scheme for split assembly to speed building. Its



Top: No 9 Sqn aircraft again, carrying their squadron badge on the nose, a curious feature revealing the identity of the unit which the code letters were in part meant to disguise. L4274 KA-K was with 9 Sqn from February 21, 1939, until October, 1939. Next is L4278, KA-H is L4260 and KA-M L4276. L4278 was also used for the first Wellington raid—but the aircraft were then coded WS—and it seems likely that their individual letters had changed too (Imperial War Museum). **Centre:** L4288: KA-Z at the Evers display in July, 1939. She had by then acquired an under wing roundel. L4320 stand beyond (Guy Destrebecq). **Above:** L4280 again showing serials under wings. She was delivered to No 148 Sqn on March 4, 1939 (Flight International).

fuselage would be made in two halves, each fully fitted out before being brought together for assembly as with the Mosquito of later years. So, with modifications to the defensive armament required, both types went ahead—with official provisos that one Wellington would be fitted with Merlins and that the second prototype Hampden would be re-engined with Daggers. It first flew thus fitted on July 1, 1937, and the troublesome career of the Hereford was inaugurated.

The Wellington suffered a set-back when K4049 was destroyed in a crash in April 1937. Its tailplane gave trouble and soon the aircraft inverted and crashed to its doom. Production and development had to proceed without the useful prototype.

It had been estimated at the production conference that the first Wellington I would be delivered in June 1937 and

the Hampden two months later. In fact it was not until December 23, 1937, that L4212 first flew finished in Dark Green/Dark Earth/Night camouflage with Type A1 roundels and under-wing serials. The Mk I was a complete re-design of the first version, having nose and tail twin-gun turrets of Vickers design, and a retractable twin-gun dustbin turret. Pegasus XVIII engines were scheduled for production Wellingtons and were first fitted to L4212 in 1938. Doubts harboured after trials with L4212 at Martlesham that the turrets might not be effective against fast, manoeuvrable fighters led to the Mk IA fitted with superior power-operated two-gun Nash & Thompson nose and tail turrets. Three Mk IAs, N2865, '66, '67, were delivered only hours before the war commenced. Bombing trials were undertaken in 1939 with L4221, and L4302 was tested from Wattisham at take-off weights up to 27,000 lb—far removed from the originally considered take-off weight.

K4240 underwent handling trials at Martlesham between November 9, 1937 and May 1938, in which month the first production machine, L4032, was flown, powered by Pegasus XVIIIIs. Its nose transparency was still more rounded and the dorsal gun position had a rounded canopy, presenting a very streamlined top line. After initial maker's trials it proceeded to Martlesham on August 19, where further trials revealed a top speed of 254 mph with full load, and an estimated range with a 2,000 lb bomb load of 1,990 miles. Its Handley Page slots cut its landing speed to 73 mph, useful because as recounted in Part 19 of this series, it was still a fear that high landing speeds would plague the new bomber force and bring problems with new airfield sites which might need long runways.

In many respects the Hampden was now seen as a compromise bomber wherein moderate load and high speed were set against the need for long range. It was soon seen that the Wellington was really a much better proposition, and when repeat orders were given for these machines, those for the Wellington were greater and its production was to almost span the war years. Nevertheless, the Hampden was to give excellent war service despite its unsuitability for much improvement. Its place on the production lines in any case would have been taken by the Halifax. Its service career was lengthened, too, by the failure of the Manchester and in more than one sense it proved a very useful 'stop gap' aeroplane.

In 1938 and '39, orders for the two types came fast, for 120 Wellingtons ranging N2865-3019, and for 100 to be 'shadow built' in the series N2735-2859. Another 50 Herefords were ordered as N9055-9081, N9084-9106, and 200 Hampdens in the range P1145-1356, of which P1145-1189 and P1194-1198 had been delivered by the commencement of hostilities. On August 8, 1938, the first shadow factory contract for Hampdens was confirmed with English Electric at Preston where 75 (P2062-2100, P2110-2145) were to be built.

Hereford L6006 with Type B fuselage roundels, but with Type A under the wing tips. An unusual feature is the wavy line demarcation of the black under surfaces (Imperial War Museum).



December, 1970



Top: L4235 after a heavy landing. Her fuselage roundel is much larger than on the 9 Sqn aircraft, the blue extending to cover the area of the old Type A1. When her paintwork was changed so was the style of the letter R (Ron Clark). **Centre:** L4159 exhibits camouflage pattern 'B'. She was delivered to No 7 Sqn in April, 1939. Type B roundels were not yet appearing on factory built aircraft. Whereas L4032 has rudder serials this machine of later vintage has not. **Above:** Hereford L6002 wears Type A roundels and although of 1939 vintage does not have under wing roundels.

At the same time another 120 were ordered from the parent firm ranging P4285-4418 and a Canadian concern, Canadian Associated Aircraft Ltd, was to produce an initial 80, range P5298-5436, the contract being signed in November 1938. On April 21, 1939, a second Hampden order was placed with English Electric and building of tarmac runways for flight test began at Salmesbury on August 14, 1939. On August 26, an aircraft design and experimental building was begun at Salmesbury, but few could then have foreseen the day when this Company would one day produce the RAF's leading fighter and bomber aircraft. The first Hampden was delivered on March 30, 1940.

Eighteen replacement Wellingtons were ordered as P2515-2532, and 82 more, on April 13, 1939, ranging P9205-9300, bringing the total to 100, 650 more were on order by September 1939. In the case of the Wellington, the first one, L4212, was delivered to Martlesham on January 25, 1938, and L4391, the last Mk I, to 38 Sqn on August 8, 1939. Apart from the three IAs, the only other pre-war deliveries were of L7770 on August 14, 1939, and R2899-2703 which were replacements for L4312-4316 undelivered, and all Mk I. L4250 was set aside to become the Mk II prototype first flown March 3, 1939, and L4251 was fitted with early Hercules engines to become the Mk III, prototype of a variant not introduced for a long time and first flown May 19, 1939.

Entry into front line service by the two types was almost simultaneous, with the Hampden making it a few weeks ahead of the Wellington, when L4034, which had been at

Continued on page 198

CFS for handling trials, passed to 49 Sqn on September 20, 1938, leaving L4032 and '33 to serve their time as development aircraft. Wellington L4215 was the first to reach a squadron, No 99 at Mildenhall, on October 10, 1938. Ten squadrons were flying Hampdens by June 1939, when L4206 was in 185 Squadron's hands. P serialised Hampdens were then initially delivered mainly to Maintenance Units for storage, whereas almost all the Wellingtons went straight to 3 Group squadrons.

Hampdens left the factory in alternate 'A' and 'B' camouflage schemes, one the mirror image of the other, and with Type A1 roundels on wings and fuselage. As with other bomber types—and, indeed, fighters—it is not possible to lay down realistic specific dates for the introduction of unit codes and Type B roundels, but it is certain that Hampdens never wore any unit numbers, and some were certainly wearing code letters in the winter of 1938/39 before these were ordered as obligatory. Unit letters were usually applied aft of the fuselage roundels, and in grey. QQ-G of 83 Sqn which was recorded in December 1938, had Type B roundels, like QX-A seen in February 1939. Serial number/pre-war code allocations seem so far to have not come to light.

Hampden squadrons in order of equipment:

49 Sqn, based at Scampton, equipped Sept-Oct 1938. Examples used: L4039-45, P1174. Coded XU.
83 Sqn, based at Scampton, equipped Oct-Nov 1938. Examples used: L4048-59. Coded QQ.
50 Sqn, based Waddington, equipped Dec 1938-Jan 1939. Examples used: L4082-65, L4073-84. Coded QX.
44 Sqn, based Waddington, equipped Jan-Feb 1939. Examples used: L4085-91. Coded JW.
61 Sqn, based Hemswell, equipped Feb-March 1939. Examples used: L4103-4116, P1170. Coded LS.
144 Sqn, based Hemswell, equipped March 1939. Examples used: L4124-35. L4141: NV-P. Coded NV.
76 Sqn, based Funningley, equipped March-April 1939. Examples used: L4137-52. P1182. Coded NM.
7 Sqn, based Funningley, equipped April-May 1939. Examples used: L4155-69. Coded LT.
106 Sqn, based Thornaby, equipped May 1939. Examples used: L4174-90. Coded XS.
185 Sqn, based Thornaby, moved to Cottesmore 8.39, equipped June 1939. Examples used: L4191-4206. Coded ZM.

Like the Hampdens, Wellingtons left the factory in alternate A and B camouflage schemes with Type A1 roundels on wings and fuselage. From the start of 1939, Type B roundels were in vogue on the VF coded examples of 99 Sqn aircraft. These early aircraft were to be seen at Mildenhall with Type A1 roundels initially, but none were recorded with code letters and these roundels. During 1939, Wellingtons became increasingly common over East Anglia, and all that the author recorded had grey codes with squadron letters aft on both sides of the fuselage.

By the spring it was usual to find that they had a Type A roundel beneath each wing tip, alongside the usual white serial. Rudder serials were not carried. The style of presentation of code letters varied from units, and the tone of grey extended from very pale on 38 Sqn aircraft to dark on 149 Sqn. Between May and August 1939, the following aircraft were recorded, all with Type B roundels with Type A under the wings: L4230:NH-O, L4231:NH-P, L4242:NH-S and NH-G; L4245 (reputedly not of 38 Sqn but certainly wearing its markings), all of these had very pale codes; L4259:LY-R, L4253:LY-P, L4257:LY-M, all with dark grey codes; L4261:KA-B and L4275:KA-H, with medium grey codes, also L4388:BH-B, L4354:UX-U and L4371:FO-Q. As a general rule the aircraft retained their original camouflage pattern but again it is wrong to categorically maintain that this was so.



Excellent painting and lettering produces this civil Ju 52 of Lufthansa in 1934 (prior to application of the swastika and red band later carried on the tail). A simple conversion from the Airfix kit by reader Johannes Feldmann of Duisburg

An unusual but very temporary breakaway from standard markings was evident in August 1939, when Wellingtons of 37 and 214 Squadrons at Feltwell had white crosses painted over their roundels for exercise purposes.

Squadrons equipped with Wellingtons prior to the war were as follows:

99 Sqn, based Mildenhall, equipped Oct-Nov 1938. Examples used: L4215-20, 22, 27-29, R2701-02, L7770. Coded VF.
38 Sqn, based Marham, equipped Nov 1938-Jan 1939. Examples used: L4230, 31, 34-43, 85, 86. L4235: NH-R.
149 Sqn, based Mildenhall, equipped Jan-Feb 1939. Examples used: L4249, 52-58, 63-66, 70-72, L4272: LY-G. Even serialised aircraft to 'A' Flt, odd to 'B' Flt.
9 Sqn, based Stradishall, to Honington 7.39, equipped Jan-March 1939. Examples used: L4260, 61, 73-78, 86-88, L4276: KA-M.
148 Sqn, based Stradishall, equipped March-April 1939. Examples used: L4280-84, 89-94, L4303-4. Coded BS.
115 Sqn, based Marham, equipped March-April 1939. Examples used: L4289, L4300-1, 4305-7, 17-19, 21-22. Coded BK.
37 Sqn, based Feltwell, equipped May-June 1939. Examples used: L4326-29, 31, 32, 36-39, 47-53. Coded FJ.
214 Sqn, based Feltwell, equipped May-June 1939. Examples used: L4341-43, 44-46, 56-65, P2699. L4345: UX-L with exercise markings.
75 Sqn, based Stradishall, equipped June-July 1939. Examples used: L4366-73. Coded FO.
215 Sqn, based Honington, equipped July-August 1939. Examples used: L4375-90. Coded BH.

Michael J. F. Bowyer

Fire Control — from page 187

happily the 6 inch and 8 inch guns had an unusually high maximum elevation for conventional surface weapons).

Thus, attacking aircraft approaching in formation well outside normal AA gun range would suddenly find themselves flying through a barrage of shell splinters, which must have been disconcerting to say the least!

Other Barrage Arrangements

Both the HACCS calculator and the FKC, it will be recalled, had been designed to predict the future position of a target flying at a constant height and speed and on a steady course. They were thus unable to cope with the solution to the Fire Control problem created by a diving aircraft and under these conditions of attack, the long-range AA armament was used in a form of controlled barrage fire. Basically, this consisted of a 'Block Barrage' in rapid fire put up at a fixed range—or sometimes at several diminishing ranges—through which the aircraft would have to fly, if it persisted with its attack.

Examples of some of the equipments discussed in this article can be seen in the accompanying sketches, as well as other directors which were dealt with in more detail in the earlier notes.

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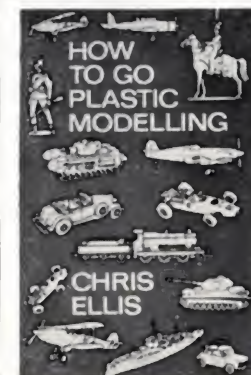
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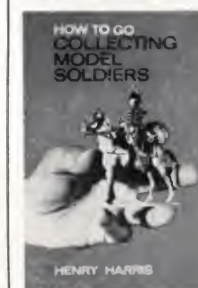


By Michael J. F. Bowyer

Michael J. F. Bowyer, well-known contributor to 'Airfix Magazine', details the development and changes in camouflage and markings of all Royal Air Force fighter types from 1937-1969 and lists the serial number allocations of every RAF fighter ever flown in that period. He records comprehensively how RAF colours altered over the years, against the background of contemporary events. Each chapter is illustrated with detailed line drawings depicting specific aircraft in typical markings of the period, with 139 individual drawings in all. In addition to 157 excellent photographs there are extensive appendices giving precise data on all RAF fighter types since 1937. 192 pages, 8½" x 5½", case bound. Just reprinted. 35s net

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1815

Modelling the armies of the Napoleonic era for wargames by Robert C. Gibson

Part 1: Anglo-Dutch Artillery

THE campaign which ended in the battle of Waterloo is thought of by many as a struggle between Britain, France and Prussia. In fact, the army commanded by the Duke of Wellington was composed of British, Hanoverian, Dutch, Belgian, Brunswick and Nassau troops. In this series of articles all the national contingents will be covered in the uniforms in which they fought.

The artillery of Wellington's army was provided by the Royal Artillery, the Royal Horse Artillery and horse and foot contingents of the Hanoverian and Dutch-Belgian armies.

The Guns

The British and Hanoverian armies used the same weapons in 1815, and at Waterloo used both 6 and 9 pounder field guns. Both guns can be made by conversion of the Airfix Civil War cannon.

The 9 pounder was most common: the carriage needs little modification and can be left untouched without detracting from the right appearance. For purists, the trail should be thickened by 1 mm at the very end, tapering to normal thickness over 5-6 mm. Ammunition boxes can be added, using boxes from the Wagon Train set (the small ones); they are 'pinned' above the axles so that when the cannon sits on the trail, the boxes are parallel to the ground. Two hooks for



Two views of British Royal Horse Artillery equipment of 1815, all from Airfix American Civil War sets. Complete horse team and mounted officer is shown at top, with gun and gun crew below.

swab buckets are made from wire and fixed under the axle. Buckets come from the Wagon Train set (or 5 mm lengths of sprue) with wire handles added.

The barrel should be shortened by 1 mm, and strips of thin notepaper 1 mm and 5 mm wide should be glued once round the front and rear ends of the barrel. A further 1 mm strip is glued round the rear end, 1 mm from the end. The whole barrel is painted matt white; the rough edges are smoothed with fine sandpaper when dry, then painted again. The barrel is then painted gold or steel (for a brass or an iron barrel—either is accurate for this period). A pin pushed into the mouth of the barrel will enable the whole barrel to be painted at once.

The carriage is painted matt-grey (Humbrol Dunkelgrau) overall with Railway Black tyres, buckets, and metal fittings.

The wheels of the Civil War cannon will also do for the 6 pounder: both were the same diameter in full size. But the carriage should be shortened in the trail by 3 mm. Remove the 'eye' before shortening and replace afterwards. Take 1 mm off each wheel hub. Ammunition boxes and buckets are fitted as for the 9 pounder, if desired. Wheels and carriage are matt grey with Railway Black tyres and fittings, etc.

The barrel is shortened by 5 mm and paper strips of 1 mm and 4 mm width glued once round. Paint matt white as before, and after sandpapering paint the barrel steel or brass.

The Civil War Limber is easily converted to a British limber: a 2 mm wide piece is cut from the centre of the box,

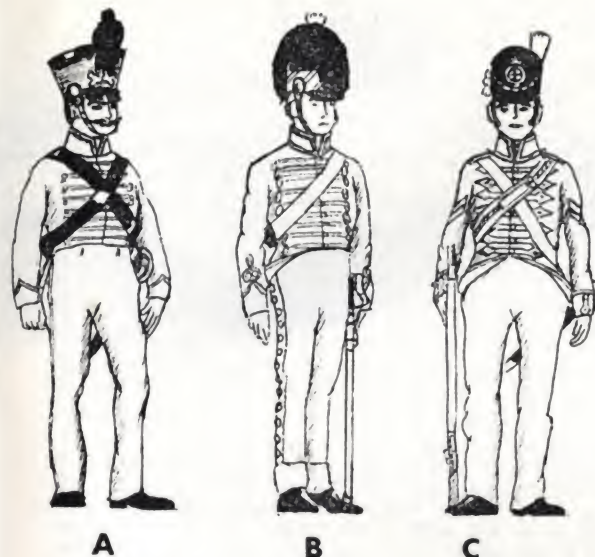
and the seat top discarded. The two boxes left are filled with Plasticine which is spread over the tops to simulate tarpaulin, then coated with banana oil to set it. The whole assembly is painted matt grey with Railway Black tyres and metal fittings.

Strictly speaking, the limber shaft did not extend to the front pair of horses, and should be cut just in front of the connector for the rear horses (the front 'connector' should be cut away from the shaft and saved). To make the linking harness, take a pipe cleaner, burn off the 'fur', and cut off a suitable length. Bend the wire ends to clip over the front and rear connectors. The final touch of realism is added with the outer shaft, cut from stretched sprue, and cemented to the top of the right wheel hub and the foremost crossbeam on the limber.

Foot Artillery

The Royal Artillery wore an infantry-style uniform: the dark blue single-breasted coat had a red collar, red cuffs and turnbacks, all piped yellow. The braid on the cuffs and tunic front was also yellow. Trousers and greatcoats were dark blue-grey. The tall-fronted shakoes were black felt with a black leather front and peak, a white plume and a brass badge. Belts were white; pouches, knapsack and sword scabbards were black leather: the sidepack was white canvas, and the water bottle light blue.

The gunners can be converted from Civil War artillerymen, preferably the Confederates. The slouch hat is trimmed down to a peaked cylindrical 2 mm high cap. A front is added from thin note-



A

B

C

paper, 4 x 4 mm, and a plume from cement-soaked cotton wool or Plasticine. The coat is cut away below the waist, as are the ammunition pouches. Swords are made from fine wire bent with tweezers or pliers, and enclosed in a 1 mm wide paper strip glued in a loop and cut to 3 mm in length. Packs can be added from Plasticine as can rolled greatcoats, all set with Banana Oil. A coat of 'Unibond' is advisable before the final painting.

Horse Artillery

The Royal Horse Artillery were dressed as pre-1812 Light Dragoons: a dark blue coat with pointed red cuffs, red collar and turnbacks, all piped in yellow braiding; the front of the jacket was decorated

with nine lines of hussar frogging in yellow. The blue-grey overalls (of a lighter shade) were tan leather inside the legs, and on the turn-ups. A red stripe ran down the outside seam, as did a row of brass buttons. Headdress was a Light Dragoon helmet, black lacquer with a yellow turban and a black fur crest, with a white plume on the left side. Belts were white, pouch and boots black leather. Swords were brass hilted; the black leather scabbard had brass fittings.

The Civil War artillerymen, Unionists this time, provide the basic figures. The kepi is trimmed to a jockey cap with a smaller peak: the crest and plume are added from cotton wool or Plasticine. The jacket is cut away at front, all



Above: Officer and gun crew of Royal Horse Artillery (left) and gun crew of Foot Artillery in shakoes (right). Left: (A) Officer of Foot Artillery. (B) Trooper of Royal Horse Artillery. (C) Gunner of Foot Artillery. Colour details given in text.

pouches are cut away, and a new pouch for the shoulder belt made from Plasticine or scrap plastic. Swords are made from stretched sprue or fine wire. The figures are painted with 'Unibond' before the final painting.

Hanoverian Artillery

Two bodies of Hanoverians served under Wellington: the veteran King's German Legion, and the recently reformed Hanoverian Army. Both artillery corps wore the same uniforms as their comrades in the RA and RHA, and worked similar guns.

Dutch-Belgian Artillery

These artillerymen fought for France until 1814; in 1815 they still wore French-style uniforms and worked French guns. They will be dealt with in the article on French Artillery.

Brunswick Artillery

The gunners of this tiny army were clad entirely in black, the seams of the trousers and the braid on the jacket being yellow. The shako was French in style with a black falling plume and a silver skull and crossbones. Belts were black. Water canteens were light blue.

The guns, as far as is known, were British 6 and 9 pounders.

New Books — from page 172

tiny board or plank on which a realistic little industrial siding scene could be constructed. There are plenty of suitable small model locomotives around including the Airfix 0-4-0ST 'Pug' and the 0-6-0ST 'Austerity' in particular, though this kit is no longer available. Space is not a prime essential for in 00 gauge a satisfying layout of a couple of sidings for a loco and a few wagons could be built on a 4-foot plank. See this splendid book and study the possibilities.

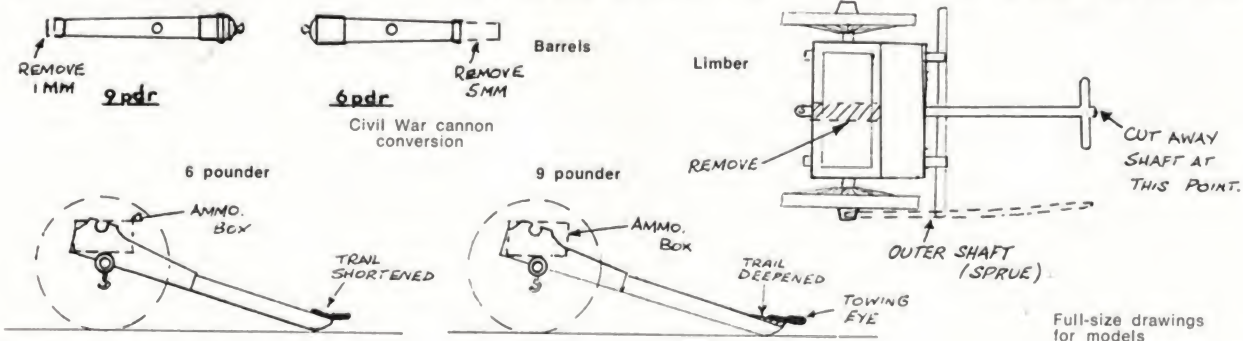
Books from Patrick Stephens Ltd

SEVERAL new books of absorbing interest to modellers are being published by Patrick Stephens Ltd this month. Coming in December is the second in the 'Classic Ships, Their History and How to Model Them' series, by Noel Hackney. Following the success of the *Victory* book, the second volume deals in immense detail with modelling the *Mayflower*. As before there is a lengthy history of the actual ship, then almost a plank-by-plank description of detailing and finishing the Airfix model to the highest possible standards of finish. Included is a 'short cut' method as well as a fully detailed method of rigging the model, there are numerous rigging diagrams, 19 photographs, and colour covers, all for 21s. Ship modellers should not miss this modestly priced work by an expert.

Of great interest to railway enthusiasts is the news that the splendid 'Boys of All Ages' series of books produced by the Great Western Railway in the 'twenties and 'thirties is to be reprinted. These books, which between them covered all aspects of the GWR, its locomotives, trains, stations, and operations, are much sought after by railfans interested in this famous railway company. The first two titles will be *Caerphilly Castle* (1924) and *The 10.30 Limited* (1923). First of these, despite its name, deals with the whole history of GWR locomotives culminating in the 'Castle' class which was the latest type in service in 1924. The second book takes as its starting point the 'Cornish Riviera' express, describing the whole journey of this famous train. From this basis it goes on to cover express passenger working in general with such topics as slip coaches, signals, safety devices, carriages, etc., all described in considerable detail. The books have 208 and 144 pages respectively and are packed with drawings and pictures. The author of both is W. G. Chapman who was a member of the GWR publicity staff. The style and presentation of these excellent books made them very famous in their time. At 30s each in hard covers (though the originals were paperbacks) these two books will appeal very much to railway modellers. Publication date, November 24.

The second in the 'Ocean Liners of the Past' series, basically made up of facsimile reprints from special issues of *The Ship-builder* of 1907 vintage, covers the famous liners *Lusitania* and *Mauretania*, ships which were as famous in their day as the *Titanic* and *Olympic*, which were dealt with in the first book in the series. As before an epilogue specially written and illustrated for the book takes the information on the ships beyond 1907 and tells the full stories of their careers. The *Mauretania* of course, became a legend on the Atlantic run, while the *Lusitania* was tragically torpedoed in 1915 in a notorious episode of sea warfare. Both ships are covered here in immense detail and will be of special interest for anyone wishing to super-detail or convert the Airfix model of the *Mauretania*. This book costs 95s and was published on November 17.

This small reproduction shows a new Michael Turner print of the famous 'Red Arrows' Gnats, and is available in full colour from Studio 88 Ltd, 95 West End Lane, Pinner, Middx. Price is 35s post free. Actual size is about 22 x 17 ins.



Full-size drawings for models

AIRFIX magazine

STALIN TANK

by

JOHN MILSOM



Part 4: The T-10 and SU series

FOLLOWING the war in Korea, the Soviet Army requested that the IS-3 tank be brought to a more modern state, especially since the T-44 medium had not turned out as successfully as expected. The result was to provide armoured skirts for the suspension, a fume-extractor mid-way along the gun barrel, and a few interior modifications. This improved model was designated IS-4, and weighed slightly more than the original IS-3. It was provided with a more powerful engine developing 690 HP, which allowed the addition of thicker armour on the hull sides. The heavier armour necessitated the use of stronger torsion bars and buffers in the suspension system.

When production of the IS and KV series was eventually discontinued, the hulls were employed for special purpose vehicles such as ARVs and mine-clearing tanks; some IS and KV chassis were used for the basis of self-propelled artillery mountings and ballistic missile carriers. A Snake mine exploder was also produced for IS tanks.

In 1953, a new heavy tank entered production and became known as the T-10 or Lenin Tank. The T-10 was designed by Kotin and represented a re-design of the IS-4. The T-10 was generally similar to the latter, but with the following alterations: essentially it had a lengthened IS chassis with an additional bogie on each side: the frontal armour was angled to give an equivalent of 150 mm at 60°: the 122 mm L/45 gun had a travelling stabiliser: the ammunition stowage was increased from 28 to 50 rounds and a fording plate was fitted across the glacis plate. As with the IS-4, the turret was domed shaped, and located forward on the hull. There were two equal-sized circular hatches fitted well to the rear on the turret roof, and raised slightly above its general level. A small round ventilator was located centrally on the turret roof and forward of the hatches. The suspension was torsion-bar with seven double road wheels, three return rollers, and a rear sprocket drive. Provision was made for protecting the suspension with skirting armour, though this has rarely, if ever, been fitted. The engine, mounted at the rear, was the same 690 HP V-type 12-cylinder diesel as used in the IS-4. A departure from the IS series was the glacis plate, which had a central V



An excellent top view of the T-10 shows clearly how it differs in detail in detail from the IS-3. Note in particular the lengthened hull and extra road wheel.

with horizontally-extended arms to the track guards.

One modification of the T-10 is known to have been produced during 1957 designated the T-10M. The T-10M differed from the T-10 in the following respects: the inverted V glacis plate extended to the full width of the vehicle, there was a different location in the mantlet for the gun sight and IR equipment was fitted (for commander and gunner). A stowage box was added on rear of the turret, and finally, the 12.7 mm machine-guns were replaced by the new 14.5 mm type. In addition, the ventilator on the turret roof was eliminated, and the gun (now fully stabilised) was fitted with a five-baffle muzzle-brake (as opposed to two on the T-10). The T-10M appeared in service in 1957.

Rumours have been reported concerning the existence of a T-14 heavy tank, based on the T-10 design, but mounting an even bigger gun; however, no official confirmation has been stated concerning such a vehicle, and it probably existed as a project only.

Self-Propelled Weapons

The first Soviet gun motor carriage which utilised the KV running gear was the SU-100Y, featuring a 130 mm gun, based on the T-100/SMK heavy tank chassis. This vehicle was armed with a 130 mm BR-3 gun, having a muzzle-velocity of 2,900 feet per second, and weighed 60 tons. It was manned by a crew of six and had armour up to 60 mm thick on the front. The engine was a 500 HP diesel giving a maximum speed of 28 mph. Small numbers of these vehicles were manufactured during 1939 and supplied to the Army. It is believed that they were employed to provide long-range supporting fire during the Russo-Finnish War.

No further standardised gun-motor carriage based on this chassis appeared until early 1943. Analysis of the trend in combat during the second half of 1942 demonstrated the necessity of supporting attacking tanks with artillery fire. Conventional field and anti-tank artillery did not possess the necessary means for fulfilling this task, mainly by reason of their limited speed and mobility. For this reason the Commissariat for Defence ordered the design of prototypes of self-propelled guns with tracked chassis for subsequent mass production. Due to the inadequacy of the KV-II tank, armoured SPs were designed with the weapon mounted directly in the hull. Soviet SPs produced during the second world war became generally known as 'armoured guns'. In distinction to contemporary SPs, 'armoured guns' possessed stronger armour since they were based on contemporary tanks.

At this time the Chelyabinsk Construction Group under Z. I. Kotin built a prototype heavy 152 mm gun motor carriage, designated SU-152, which was designed and built within 25 days. The SU-152 mounted the Model 1937 152 mm corps gun/howitzer of the KV-II tank on the KV-1s tank chassis, and entered production during February 1943. It first saw action at Kursk during that same year. The new vehicles began to enter Soviet units during the Spring of 1943. It was then that the Red Army was beginning to form new combined units of tanks and SP guns—referred to as 'Tank-SP Groups'. The SU-152 became the only standardised self-propelled mounting utilising the KV chassis until 1944, when the SU-122 was built. The gun had a muzzle-velocity of 1,900 feet per second and a range of 19,000 yards. A direct-laying telescope was fitted to the left of the gun above the recoil mechanism. Traverse was about 10°. The shells

weighed about 95 lb and were semi-fixed (case and projectile loaded separately). An interrupted-thread breechblock was used instead of the wedge type of other SUs. The commander was situated to the right, and the driver to the left front. Hand-rails were fitted for tankborne infantry. Only 28 rounds of ammunition were carried. The vehicle weighed about 50 tons and could ford up to the height of the track guards. In the combats with the German heavy tanks the SU-152 proved of particular value and became highly regarded by Soviet soldiers: they called it the 'Zveroboy' (Conquering Beast). The SU-152 was removed from service in 1944. Sixteen of these vehicles formed each heavy SP regiment.

Among the SPs built in competition with the IS heavy tank series were the KV-7 on the KV-1 heavy tank chassis, which mounted one 76 mm and two 45 mm guns, and the KV-9 with twin 76 mm guns. These were prototypes only, however, and did not see service.

Concurrent with the production of the SU-100 (based on the T-34 medium tank chassis) there appeared the SU-122, self-propelled 122 mm gun designed for fighting German heavy tanks. The SU-122 consisted of the long model 1931-37 122 mm gun (muzzle velocity 2,625 feet per second) mounted on the modified chassis of the KV tank (interchangeable with the 152 mm M-37 howitzer to form the SU-152). Only 35 of these SU-122s were produced during 1943, and they were not widely used. They were removed from production when the Stalin tank appeared. Both the SU-122 and the SU-152 were attached to regiments and divisions of armoured artillery, infantry divisions and armoured corps.

Following the introduction of the new IS heavy tank series, those self-propelled mountings formerly built around the KV tank components were transferred to this new tank. The older SU-122 and SU-152 carriages were removed from service during Autumn 1943 and replaced by the ISU-122 and ISU-152 mountings during 1944—both based on the IS-85 heavy tank.

On these new SPs the crew compartment was made higher and more rectangular with less-sloped side armour. KV hatches were replaced by tank and SU-100 cupolas—then in production. These hatches were fitted with the new war-time simplified standard periscope of which there was one in the front right, and one in the front left hatch. No cupola was fitted. The ISU-122 mounted the 122 mm M-1944 L/45 A-19 gun having a wedge breechblock, and fired a 55 lb shell to a range of 14,200 yards; 1,510 vehicles were produced during 1944. Further ISU-122s received the 122 mm tank gun D-25S L/43 (distinguished by its muzzle-brake), having slightly greater armour penetration. The ISU-152 mounted the original M-37 152 mm (modified ML-20) howitzer firing an HE shell weighing 96 lb to a range of 9,800 yards. It also fired a 107 lb AP round.

The effectiveness of the ISU-152 was greatly hampered by its limited stowage of only 20 rounds of ammunition. A machine-gun was mounted on the right-hand side of the superstructure for close-in protection. The vehicle was identical to the ISU-122 (A-19S) apart from the gun. It was used as a support weapon to accompany medium tanks in the motor-rifle and tank divisions, as well as in independent units. The Russians stated that the only reason for continuing production of the ISU-122 while the ISU-152 was in service was because a large number of artillery pieces were in stock for this model.

The major differences between the ISU and its original SU series were its lower suspension system and a higher and less-sharply-sloped superstructure. Also the vehicle mounted a new,



Most handsome of the ISU series was the later ISU-122 with the D-25S gun which was distinguished by its muzzle-brake. This was lacking on vehicles with the A-19 gun.



Top: The ISU-152 had a higher, more squared off superstructure than the original SU-152, though the gun was the same. Above: SU-152s fording a river during the summer of 1943.

heavy, two-piece mantlet mounted on the right-hand side. The inner section of the mantlet was bolted to the superstructure, while the outer section was moveable, allowing the gun to be elevated and traversed. The lower suspension gave the impression that the fighting compartment had been raised. Several modifications have been observed in the ISU-152, including provision for skirting armour, sponson boxes, and redesigned track guards.

During the War, these SP guns fought enemy tanks and anti-tank artillery and accompanied motorised infantry and tank units. All these vehicles were manned by tank personnel.

Vampire — from page 188

Stopping breaking away) and the leg is cemented in place. The main legs are modified by filing the axle to give a downwards angle, and, after boring the holes in the wing/boom, are cemented in place. Make and fit all undercarriage covers and doors from 10 thou plastic. Bend the front undercarriage door to shape before fitting. Note the small stay at the top end. Cut a length of heat-stretched sprue and fit it under the port wing to represent the pressure head.



Colour scheme is standard 1945 Temperate, Grey/Green/Grey. Later versions had aluminium paint on the undersides. My model is finished to represent ZY-Z, serial TG301 of 247 Squadron. Alternative schemes are covered in Michael Bowyer's excellent book *Fighting Colours*. The only roundels you may have trouble finding are the tiny ones for the booms. I used flatted transfers from the Frog 'Proctor' kit, but there may be others equally suitable.



The SU-152 was distinguished from ISU models by its lower superstructure with more sharply sloped sides.



Aircraft of No 892 Sqn, FAA, neatly lined up on the deck of HMS Ark Royal as the ship was about to enter harbour at Oslo, Norway, after having taken part in the NATO exercise 'Northern Wedding'.



RAF GATOW on the edge of the British sector of Berlin, is an airfield that looks almost deserted, but it has a capability of maintaining a large number of operational aircraft. All of the necessary facilities are there. The air traffic building is of the most modern design; the ten large hangars are waiting to be occupied, and the parallel runways, although a relic of the Berlin Air Lift led the way to current thinking on aircraft handling at busy airports. Apart from a small flight of Army Siouxes and two Chipmunks, no aircraft remain at Gatow for more than 24 hours and the reason... a quick look just beyond the perimeter fence and even the most casual observer can see the 'goon' boxes occupied by the Russians and their East German colleagues watching all movements on the airfield.

RAF Gatow is the airhead for British Forces stationed in Germany in the 'island' city of Berlin. I recently spent a week there and can report that the feeling of isolation is all but complete. For Berliners, the way out is through the British, French and American airlines that run regular scheduled services through nearby Tempelhof, for others there is the road and rail link with the west, but for all intents and purposes Berlin is cut off from the rest of Allied Europe.

Britain, France and America intend to hold on to their foothold in the east and to do this they must maintain their forces in Berlin. Almost all supplies for the garrison come in by air apart from heavy material such as coal, oil and most foodstuffs. The Berlin blockage of the late 'forties proved that a city of several million people could be supplied by air and the three airfields belonging to the western powers are kept at full operational readiness in case they are needed again.

Nowadays, incidents are few but when trouble does arise the Allies send aircraft down one of the three Berlin air corridors to maintain their right to free and unlimited access to the city by this means. The only remaining link between the Russians and the West is in fact the International Air Traffic Consortium which controls the vital air lanes into Gatow, Tempelhof or the French airfield Tegel.

Gatow, like Tempelhof, is in a strategic position. It differs from its American contemporary, however, in that it has always been used for military purposes. When Hitler came to power in 1933 one of his first aims was to circumvent the provisions of the Treaty of Versailles which, after World War I had denied Germany the right to re-arm to any dangerous extent. Thus, in 1934 he set up a combined Sportschule, Forestry and Agricultural Experimental Institute which was astride the Gatow-Kladow road near Berlin.

The building project was completed in record time, even by comparison with the highly mechanised methods of today and, as an airfield of its day was a very bold concept with ten hangars and six miles of perimeter. This operation was not wholly a front because such an Institute did exist as many of the remaining buildings prove. It is, however, significant that the airfields built for the use of the Institute in other parts of Germany were later to become important military establishments and some of the Institute's aircrews were members of the National Socialist Flying Corps. They were later to reveal their true identity as fully-trained Luftwaffe officers.

As soon as Germany had built up sufficient strength to defy the signatories to the Treaty of Versailles the 'front' organisations disappeared and then an efficient fighting machine emerged. Over-night Gatow became the Cranwell of the Luftwaffe; a Flying Training School and also the base of the Reichluftfahrtministerium Communications Squadron. The present-day RAF Gatow Hospital across the road from the airfield housed the Air Force Staff College.

Gatow operated in its training role for most of the war period—indeed right up to the final chaotic weeks when the rapidly contracting Third Reich resulted in a miscellany of aircraft flying into the airfield. Despite its close proximity to the centre of Berlin it was only bombed on one occasion in November 1943. In this raid one wing of what is now the Warrant Officers' Married Quarters was destroyed as well as other small buildings.

One of the last wartime users of Gatow was Speer, the Armaments Minister who was later to serve 20 years in Spandau Prison. Speer flew in on April 23, 1945, only eight days before the complete occupation of the city. He took off again in a light aircraft which landed in the broad avenue leading up to the Brandenburg Gate and visited Hitler in the Chancellery bunker. Optimistically he had the aircraft wait for him in spite of the heavy shelling—optimistically that is because he had flown in to report that he had not carried out Hitler's order of a 'scorched earth' policy in the remains of Germany. Instead of being shot he was allowed to go.

Another visitor at this time was General Ritter von Greim who was, on April 26, 1945, piloted by the celebrated woman pilot Hanna Reitsch, and landed at Gatow and made his way to Hitler's bunker where he was made Commander-in-Chief of the Luftwaffe in place of Goering. He probably had misgivings about being summoned to Berlin to receive such an obviously short-lived honour.

At the end of the War the Russian Air Force occupied Gatow for a short time but under the final settlement of Sector boundaries the airfield was placed just within the borders of British administration and the Russians eventually withdrew.

There is little left at Gatow to show that the Russians did in fact take over the airfield. One small item does, however, still exist, and that is a notice painted on No 6 Hangar—'Pozarny Kran'—a fire point. The British advance party arrived to take over the airfield and were promptly locked up by the Russians as they said that the RAF had arrived two days early. When the matter was finally sorted out, Gatow became No 19 Staging Post, RAF, and the first aircraft to land there, an Anson, arrived at 1155 am on July 2, 1945. One month later Gatow became an RAF Station and Group Captain Summerville was appointed in command. He had with him 16 officers and 350 men. Nowadays there are over 600 servicemen on the Station.

On June 24, 1948, three years after the RAF had taken over the airfield, the Russians blocked all surface transport between West Germany and Berlin to force the city into submission. The Allies replied by staging the biggest-ever air lift in history which lasted for 15 months and which carried 2,325,908 tons of provisions in 277,000 flights. For the 2½ million Berliners the air lift became the only means they had of being able to survive. Commodities such as coal, fuel oil, news print and medical, military and industrial supplies were flown in by Yorks, Hastings, Dakotas, C-54s and a variety of civil aircraft from the other side of the Iron Curtain. Gatow,



First photograph of another new Phantom squadron aircraft for the RAF. This one belongs to No 17 Sqn which recently formed at RAF Bruggen, Germany. Previously the squadron was equipped with Canberra PR7s

Templehof and later Tegel had their runways strengthened and later doubled so that parallel systems to take the transport aircraft arriving at 60 second intervals throughout the day and night could be accommodated. Gatow's spacious hangars became the centres for distribution and many German workers were employed to off-load the aircraft and turn them round without delay. Sunderlands of Coastal Command were even brought into the air lift and landed on the Havel Lake close to Gatow.

Walking round the deserted hangars today it is difficult to realise how important a part Gatow played in the survival of West Berlin. Now only two RAF aircraft remain and although a 38 Group Argosy visits almost every day the sense of isolation is almost complete.

P-40N Thunderbolt—from page 174

of the leading edge, the underwing bomb/fuel tank attachments wing guns and the flap area. The resulting 'Z' shape can best be seen from the photographs. Again, a piece of ½ inch balsa replaced the plastic but this time I made the shape by comparing what was needed with the plan and cutting a piece of wood ½ inch wide all round to allow for any slight mistakes in the shaping. This was then stuck in place and together with the fuselage left a further 24 hours to dry out before any more work was attempted.

STAGE 3 Note that the wings and fuselage were not joined until all shaping had been finalised. This operation was done with a sharp knife, file and sandpaper. The fit around the under wing attachment points has to be carefully done as a slip here could result in either the removal of part of the plastic or a kinky look to the wing underside. The file proved to be the answer to getting this part smooth and finishing was done with a very fine 'wet and dry' paper after the application of a liberal coating of clear dope and talcum powder mixture to fill the grain. The fuselage was similarly treated with filler and rubbed down.



The rear fuselage is sanded to shape and this picture shows the addition of the fuselage to fin fillet. A 'V' cut is made in the base of the fin and the thickness of the wood used should be the same as the fin.

STAGE 4 To complete the fuselage modification a thin spine has to be added running from the base of the fin forward to a length of 1½ inches. To make this I used ½ inch sheet balsa and cut into the fin base in a 'V' shape so that the wood could rest in the area satisfactorily. Looking at photographs it appears that the real thing is done this way and therefore any slight line left after rubbing down would look natural. The fillet has to be the same thickness as the fin at the rearward end and tapers rapidly to a much thinner cross section. The shape was

The ailerons are cut out with a knife, the inner edge sanded and then re-cemented into position. Note that all of the wing rivet and panel line detail has been removed to avoid a half-and-half appearance against the wooden section.



December, 1970

carved and sandpapered first and then given a very liberal coating of filler to ensure that, when dry, this moulded the shape into the fuselage line.

STAGE 5 Before joining the wings and fuselage I decided to use the Revell cockpit interior as this was superior to the Airfix one. You will find, if you use this method, that both kits marry up very well, which probably says much for the accuracy of both. Having assured myself that the Revell part was firmly adhered I stuck the fuselage to the wings and filled the large and irregular gap between both items with plastic paste. The join line was eliminated by half an hour's solid sandpapering. Tailplanes and tailwheel can now be added and a start can be made on the undercarriage by sticking the legs in place and allowing them to dry out.

STAGE 6 To give added authenticity, particularly in view of the fact that I had removed most of the wing lines and rivets I cut out the ailerons and glued these back in place after having shaped the edges a little so that the gap would show. This operation can be done after the wings are mated to the fuselage, or before, depending on the taste of the individual. In either case the job should be done before the addition of the undercarriage legs.

STAGE 7 One of the slight mistakes in the Airfix Thunderbolt is, I feel, the way in which the wheels are mounted. It is unfortunate that detailing does not appear on both sides of the hub and to assemble these items as kit means that the viewer sees most of the 'untreated' side. I therefore drilled out the holes until they fitted over the undercarriage leg attachment point so that when assembled the wheels went on the wrong way round.

STAGE 8 Final assembly included the addition of a D/F loop to the rear fuselage, the undercarriage wheel doors, the pitot head and two small radio aerials made from plastic card, on either side of the rear fuselage fillet. I also added an under-fuselage drop tank taken from the Revell kit, a Revell propeller and Airfix bombs. The two latter, together with the cockpit canopy from the Revell kit (which fitted exactly), were added after they had been painted and after the rest of the model had been completed.

PAINTING AND MARKINGS The Connecticut Air Guard P-47N I modelled was finished silver overall with an olive drab top decking running from the engine cowling to the base of the fin. The framing of the windscreen was also in the latter colour but the remainder had a silver outline. The top of the fin was yellow and the prop black with yellow tips. The propeller boss was also yellow and in the photograph I used as reference had two stripes round its circumference. These appeared to be red in colour but I may be wrong in this instance as I had to guess what the colour might be. This aircraft was serialised NG 489316 on the fin in 2 mm high (scale) letters, painted black. CONN. NG appeared on both fuselage sides in ⅛ inch high black (scale) letters. Both of these are available in the AIR decal sheets and I also used the national insignia from the same source. These transfers are some of the finest yet produced for USAF aircraft although rather expensive.

Ready for painting. The wing/fuselage joint has been filled and rubbed down. A D/F loop and two small radio aerials have been added.



NEW KITS AND MODELS

Hasagawa: 1:32 scale Fw 190

THE popularity of 1:32 scale aircraft kits as pioneered by Revell meant that sooner or later some other manufacturer would be tempted into this scale. Predictably enough a Japanese firm, Hasagawa, has taken the first step with the release of a very fine replica of the Focke-Wulf Fw 190A in a form which allows the model to be completed as any of five sub-variants of this mark. Hasagawa already enjoy a reputation for fine moulding and detail accuracy in 1:72 scale, and their 1:32 scale model is a splendid replica of the real thing. Apart from impeccable detail treatment which seems photo-accurate when compared with pictures of the actual aircraft, the parts fit together very snugly indeed with very little need for filling and filing. Assembly is particularly straightforward and Hasagawa have eschewed working parts except where they do not interfere with scale accuracy. Thus the cockpit canopy slides, the engine cowlings, lift off, and the propeller and cooling fans rotate, but control surfaces are fixed (though the flaps can be cemented open). It would be easy enough to cut out the ailerons, however, and cement them in place suitably 'drooped'.

Particularly praiseworthy is the provision of optional parts for so many variants, plus a big sheet of excellent transfers to cover them all. Colour scheme details are given on both the instruction sheet (in tone) and with colour illustrations on the box—for all variants. This aspect of the kit is much superior to Revell's vaguer approach to marking and colour details. Our advanced sample came from BMW Models who hold stocks. English instructions may be included in the production batch, but the original Japanese sheet is easy enough to follow. Price is 50s. postage extra. C.O.E.

Prototype Models: Signal Box

FROM Prototype Models, 2 Northampton Road, West Haddon, Rugby, we have received samples of two new kits for models of Stamford East Signal Box; one for 4 mm scale and the other for 2 mm scale. The well designed parts are colour printed on card and need to be cut out and glued with, as suggested, an impact adhesive. These quality kits are noteworthy in that they are modelled after an actual prototype (Stamford East Station was the terminus of the former GNR branches to Wansford and Essendine) and the finished model has that added touch of character as a consequence.

Each of the two kits uses quite different assembly methods. The 2 mm scale model has for instance been considerably simplified and is but a basic structure with printed unglazed windows. Assembly is almost self-evident and few instructions are needed. The 4 mm scale model, however, has a lot of relief detail and glazing material is supplied with the window

frames already colour printed. A comprehensive two page instruction sheet is included.

There is in fact a third kit since a set of parts similarly detailed, as the 4 mm scale model is also available in 7 mm scale, ie, 'O' gauge. This should make into a really superb model since the added size gives a lot of scope for increased detail. The kit prices are 2 mm scale 2s + 6d postage, 4 mm scale 9s 11d + 1s postage and 7 mm scale 14s 11d + 2s postage. N.S.

Almarks: 54mm soldiers

FROM Almarks we have received advanced samples of a new line of 54 mm scale (1:32) model soldier kits they are doing, some details of which appeared last month in Roy Dille's column. Kit No 1 is for German Panzer-Grenadiers, eleven of them, while kit No 2 is for Japanese Infantry of 1939-45. Ten figures are given here. Both kits are similar in that they offer the basic bodies less arms, weapons, and headwear, with a second

Right: Five of the ten figures from the Almarks Japanese Infantry kit, shown assembled but unpainted.



sprue containing sufficient arms, guns, etc. to fit every figure out. The hats, either helmets or forage caps, are on a third sprue and, again, these can be fitted as desired. A sprue chart shows a theoretical allocation of arms to give you complete figures, but naturally the modeller can switch arms, guns, and headwear around at will to give quite a permutation of different poses. So for the model soldier fan the kits offer quite a lot of possibilities. Being made in polystyrene, rather than polythene, conversion and limb changing, etc. is quite easy. Just like converting any other sort of kit in fact. Pegs on the feet fit into optional bases, also available, but they can be fitted on to plastic card bases if desired or straight on to the 'ground' in dioramas. The figures are extremely well sculpted and most convincing when assembled. A modicum of flash has to be cleaned off most, but this is very slight. The boxed kits include basic assembly and painting instructions, colouring being aided also by reference to the simple colour box art. Prices are attractive at 15s a set, which works out at not much over a shilling a figure for models of collector quality.

The Almarks kits can be had from most major model shops, and we gather that further sets, plus a German weapon accessory kit, are to be released early in 1971. C.O.E.

Hasagawa: 1:72 scale aircraft

THREE popular 1:72 scale kits which are (or have been) available in the Frog range are now on sale in Britain in their original Hasagawa form. We've reviewed them all before in the past couple of years, but in Hasagawa packaging all are worth looking at since they come with different markings from those issued by Frog. The F-100D Super Sabre offers a choice of four different USAF machines, though the box art and instruction sheet shows only one of them. The outstanding feature of this kit, however, is the beautiful 'natural metal' plated finish which makes the kit really worth having despite its 20s price tag. Second model is the F-86F Sabre which is supplied with Japanese markings, while the F-5 Freedom Fighter comes with two sets of USAF transfers, one set for a natural metal aircraft and the other for a camouflaged machine. These two latter kits cost 6s 6d each, postage extra, from Jones Bros Chiswick. C.O.E.

Graham Farish: N gauge wagons

MODELLERS in N gauge have so far had relatively little available of British railway prototypes, compared to the vast number of N gauge models available covering American or European railways. However, Graham Farish, well-known for their OO Formway track and models, have now started in N gauge with track, plus the welcome release of some British goods vans and wagons. These latter turn out to be most excellent little miniatures produced to commendably fine scale standards, all in plastic. Our samples comprised a 12 ton SR box van (the same as the



OO version by Ratio) and a LMS five-plank open wagon. The wagon costs 5s 11d and there is a seven-plank version at the same price. The van costs 6s 4d and there is a LMS type van at the same price. The chassis can be had separately for 4s 11d to take scratch-built bodies. There are no markings on the van but there is a

Continued on page 208

MODEL TOYS

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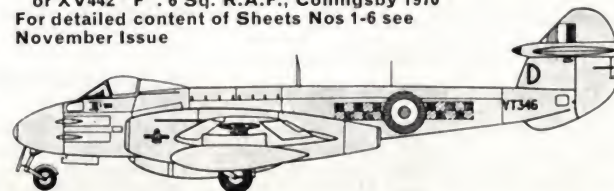
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H.S. Harrier GR.Mk.1. XV744, I(F) Sq. Late 1969
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New Kits—continued

Blick-type dry transfer sheet available separately at 7s 11d which has a big selection of company initials, etc. easy to apply. Couplings are the usual N gauge knuckle type which is a little obtrusive compared with the fine detail of the wagons. Removing the coupling and replacing it with a wire hook greatly improves the overall appearance we found, but the automatic coupling facility is then, of course, lost. Our samples came from Jones Bros of Chiswick who can supply by post, postage extra. C.O.E.

Tamiya: M4A3, (76 mm) 1:35 scale

LATEST 1:35 scale AFV kit to reach us is a fine model of the M4A3 (76 mm) HVSS Sherman, the late production version of this famous vehicle with 47 degree hull front, wide tracks, 76 mm gun, and large turret. Tamiya have excelled themselves in producing this kit, which is externally just about 100 per cent accurate and very much superior to earlier Tamiya Sherman models. Just about every detail of the original is perfectly reproduced and the HVSS units are very well modelled complete with detailed attachment points. The only physical liberty taken is bulging the belly to incorporate the model's drive mechanism but this is, in any case, not visible from normal viewpoints. The track is in flexible 'metallic' plastic of most convincing appearance.

Our sample was the remote control version, priced at 39s 9d, which has two motors and a nose-mounted gear drive to each sprocket wheel. Assembly is quite straightforward, following the beautifully presented instruction sheet. Optional markings for two Japanese (post-war) or one US Army vehicle are shown on the painting diagram, though our advanced sample lacked transfers. Tamiya call the model a M4A3E8, which is an accepted description though not strictly speaking correct. The kit is available from Jones Bros of Chiswick or other mail order specialists, postage extra. C.O.E.

Olive Models: 54 mm soldiers

COLLECTORS and enthusiasts interested in the later Colonial Wars of the British Empire will be delighted with the Olive range of sixteen figures, all in service/campaign dress, and mostly covering the period from the Zulu War to the Boer War of 1899. Designed by an expert on this period, each model has an authentic late Victorian 'feel' about it, and details of uniform, equipment, and armament are accurately depicted, though the lances are longer than scale 9 ft length and need trimming down. The pieces are individually animated so that no two are exactly similar, and a considerable variety of basic attitudes is available. We particularly liked the Camel Corps trooper of the Sudan War, 1884-5, and the jaunty Petty Officer in the Naval Brigade of the Boer War. Four non-Colonial models of the same exacting standard are included in the range; these are a British Infantryman of World War I in shirt-sleeve order, a US Cavalry Scout and US Indian Scout of the Indian Wars, and a French Napoleonic Hussar in stable dress. Whilst the excellence of the engraving provides the basis for a satisfactory painting job by even a newcomer to the art, these figures can be



Top row: Miniature Figurines' 9th Lancers, Crimean War officer, painted Olive 9th Hussars, Miniature Figurines' French Hussar, RFC pilot, German Officer, 1914. Above: Olive US Cavalryman, Boer War RN Petty Officer, Camel Corps trooper, Boer War Guardsman.

obtained fully painted for the collector who feels he lacks the time to carry out the work himself.

Our review samples were supplied by The Garrison, 198 Northolt Road, South Harrow, Middlesex, HA2 0EN, from whom figures can be obtained at 16s 6d unpainted, and 90s painted, post extra. R.S.D.

Miniature Figurines: 54 mm Soldiers

THE avowed object of the designer of Miniature Figurines' figures has been to produce, as far as possible, unusual items that have not been covered by other manufacturers. Although eleven of the present range of nineteen figures depict Napoleonic subjects, unusual orders of dress are represented, showing soldiers of the period in situations other than parade or battle. The British Army of the mid-nineteenth century is covered by infantry officers of the Sikh War, Crimean War, and Indian Mutiny, and the last is complemented by a trooper of the 9th Lancers in campaign dress. There is also a US Medical Officer serving in Cuba in the Spanish-American War of 1898, and a sprucely turned out girl officer of the First Aid Nursing Yeomanry in 1908. Finally, World War I provides the inspiration for an officer of French Cuirassiers 1914, a German Infantry officer of the same year, and two British figures, a Royal Flying Corps officer, and a tank-driver in 1917.

All the figures have been designed by Major R. Rowe, whose dioramas at Woburn Abbey attract great interest, and every piece is individually animated and unique, whilst models can also be specially animated to the customer's specification. Engraving and casting is of a high standard, enabling modellers to carry out an effective painting job, but figures can also be supplied completely finished. Small criticisms of this range concern the bases which are rather crude, and the lances which seem too long. At 21s each (27s 6d for special animations) unpainted, and 84s (90s specially animated) these figures are worthy of a place in any collection, and we look forward to additions to the range, which can be obtained from Miniature Figurines, 5 Northam Road, Southampton, SO2 0NZ, by whose courtesy we received our review samples. R.S.D.

Ratio: 00 gauge wagon kits

RATIO are to be congratulated once again on two superb new 00 gauge plastic rolling stock kits. The first for a SR 12 ton Box Van fills a long felt want since this very common wagon, still to be found in large numbers all over the BR system, has not been available in model form before. The quality of the plastic mouldings and the accuracy and fit of the parts is first rate and the model is both foolproof to assemble and 100% authentic in outline. The SR 12 ton Box Vans were featured in the December 1966 *Airfix Magazine* with a suggested method of conversion using the Airfix Meat Van kit. The Meat Van kit is, alas, no longer with us but perhaps now



we have something even better since the SR Box Van is such a useful prototype. The body styling chosen is the type with alternative 6 inch and 3 1/2 inch planks and this feature has come out well on the model. This well designed kit fully justifies the price of 15s 6d. Supplies are available from Jones Bros, Chiswick.

The second Ratio kit is really part of the first since it is a complete set of under-frame parts as supplied in the SR 12 ton box Van kit but sold separately at the reduced price of 6s 3d. The underframe is a scale 10 ft wheelbase and is therefore suitable for a wide range of prototypes. Unlike other recently introduced Ratio kits, no couplings are included in these two kits but otherwise everything from and including the floor downwards is supplied.

Air Review: colour prints

FROM Air Review Ltd, Letchworth, Herts, we've had samples and news of the release of a series of enlarged colour prints taken from the well-known Harleyford range of aviation books. These are the paintings familiar to many as the covers and frontispieces of these books. There are 16 prints all together, each four times bigger than they appear in the books, that is to say 14 1/2 x 11 1/2 inches on glossy art paper 20 x 15 inches overall. Four groups of four have been released, monthly from August through to November. Individual prints cost 20s each (53) but there are reductions for multiple orders, eg, 55s for three assorted prints or 100s for any six. A large free leaflet is available on request from Air Review Ltd and this gives full details and miniature tone samples of the prints available.

From Authentic Colour Prints, 20 The Coppice, Gatenby, Northallerton, Yorks, comes an attractive print of a Jet Provost T3, of 3 FTS, in the new red/white/grey training scheme. This is a plain side view, Profile type, very accurately marked, though the stencil instructions on the airframe aren't quite big enough to read. This print costs 20s, plus 1s postage. C.O.E.



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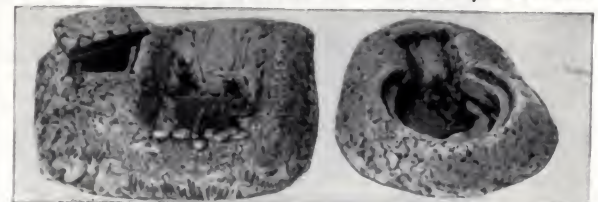
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Colours 1960

WITH reference to Michael Bowyers' article which appeared in June issue, here are some points I would like to make.

In late 1960, No 75 Squadron Canberra were painted silver overall. Early 1960 insignia on the fin and rudder was a medium blue map of New Zealand painted over a fluorescent red kiwi. Fin leading edge was sometimes black, and the large panel behind often a light grey colour. This insignia was gradually replaced by a bottle green tiki sporting bright fluorescent red eyes and tongue. Many aircraft acquired additional markings from the various squadrons and units of other bases visited. No 75 Squadron's Canberras never carried camouflage markings. Their aircraft were returned to their original owners a long time before camouflage was introduced on most aircraft in South East Asia during the Indonesian confrontation.

No 45 Squadron Canberras, similarly, were painted silver overall, during the period prior to confrontation. Insignia consisted of a medium blue camel with bright red wings on a large white disc ringed with same blue colour. The red fin leading edge Mr Bowyer refers to was probably red dope over a fabric covering sometimes used. When the 45 Squadron machines were eventually camouflaged, they initially retained their insignia in the same dimensions. However it was soon miniaturised. Both No 14 (NZ) Canberra B112s and No 45 Canberra B15s were camouflaged in grey/green/silver. Serial numbers were large white, soon altered to large black, and finally small black. No 14 Squadron insignia, a white kiwi on a black disc remained constant through all the other colour changes. At a later date No 45's aircraft had light grey colour undersides. When No 14's aircraft were first camouflaged, one was mistakenly painted, in the rush, with colours in reverse order. It was soon repainted to the intended scheme. The particular outsider was NZ6110 if my memory serves correctly. Unfortunately I never recorded it on film.

Mr Bowyer mentions a Mk 6 WH977 belonging to No 9 Squadron. I last saw this aircraft in February 1969, at Tengah, with No 45 Squadron, in camouflage, of course, as a Mk 15.

In the photo supplied, WH874's camel carries a black kiwi. These kiwis mysteriously appear on most aircraft that happen to land on New Zealand soil. The same applies to aircraft visiting Australia. I have seen at least one large kiwi carrying a small kangaroo, complete with reins.

R. A. London, Auckland, NZ.

M. J. F. Bowyer writes: *There is no doubt at all that the aircraft I mentioned was camouflaged. I had a picture of her so finished. The red mentioned was a red painted stripe. I examined the aircraft personally.*

Photopage error

I WOULD like to point out an error in the August issue. The page of 'RAF in Russia' photos—No 2, this is NOT a bomb sight but a standard type camera mounting. Incidentally I would think that the serial on the machine shown is F1753 though it could be 1755.

Paul Leaman, Cove, Hants.

Moondust

I HAVE found a very effective means of forming a layer of 'moondust' on the patch of 'moon' provided with the Airfix Lunar Module. The entire surface should be painted light grey, and before this is dry, sprinkle a layer of fine cigarette ash onto the paint, and smooth out. The area directly under the nozzle should be sprinkled over. Then blow gently on this area. The ash should spread outwards.

This method, but with thicker ash and black paint, can also be used for burnt surfaces on 'blast deflectors' in carrier layouts. The 'burnt' surface can be touched up with silver spots to suggest unburnt patches.

M. Crellin, Taunton, Somerset.

Mr Crellin sent us a most convincing sample of this miniature 'moondust'.—EDITOR

Meteor picture

I WAS very interested to read the comments made by Peter Finch in 'Letters to the Editor', October 1970.

Mr Finch is right about Meteor EE459 being a Mk IV, but he is incorrect in his assumption that the photograph (page 542, July 1970) was taken at Horsham St. Faith between December 1947 and June 1948, also in his assumption that this aircraft was not on the strength of 74 Squadron until December 1947.

I took the photograph in question in August 1947 at RAF Lübeck when Meteors were stationed in Germany for the summer months for air gunnery practice. I was serving with No 3 Armament Practice Squadron (flying Martinets) at that time. The Meteor was taxiing to the main runway closely followed by Martinet QK-H prior to a gunnery 'detail' over the Baltic—target, a towed drogue!

Peter Bullivant, Grantham, Lincs.

USAF colours

WHEN using Humbrol Authentic Colours from the USAF Vietnam camouflage range I have noticed that the lighter of the two greens, 34102 (MU8) turns a dark olive green after a coat of matt varnish, necessary to improve the tone of the other colours. This resulting colour is totally unlike the actual shade so I set

Below: 75, 45, and 75 Sqn Canberras mentioned in Mr London's letter. Note slight variation in serial positions.

out to discover a formula that would give a more accurate colour under a coat of varnish. After several attempts I found that a mixture of Humbrol Authentic Colours MU8 and MB8 (Dark Slate Grey) in equal proportions gave a very accurate colour when varnished. I have used this formula on several models and the resultant colour looks very realistic after comparison with actual aircraft seen at various airshows this season. Incidentally I use 'Blackfriar' polyurethane matt finish which gives a very smooth slightly glossy finish similar to the actual aircraft finish.

M. A. Gould, Solihull, Warks.

Meteor tips

HAVING learned a lesson from the Frog Meteor IV, I was unwilling to make up my Airfix Meteor III without knowing whether or not it would balance properly on its undercarriage. So, after cementing the fuselage halves together, modellers may like to try this method of adding more weight forward of the wheel wells.

Cement a strip of stiff card (I used a piece of postcard) about 1 inch long and 1/4 inch wide, to the top of the fuselage interior, pressing it in the centre so that it assumes an inverted 'V' shape. Ensure that its forward end rests against the cockpit bulkhead (part 2) and covers the gap immediately behind the bulkhead. The card forms a base for the filling material, added as the fuselage is held upside down.

The area between the bulkhead and the locating cut-out for the wing assembly can now be filled with one or two small metal washers, firmly secured with Sellotape, and Plasticine or lead shot. That area of card just behind the bulkhead can be painted to match the cockpit interior. More weight should, of course, be placed in the extreme nose, and for good measure, in the engine nacelles forward of the wheel wells.

One point about the instruction sheet. It gives the impression that all Meteor IIIs had Derwent engines from the beginning. EE239, subject of the kit, was one of the first 15 Meteor IIIs (EE230 to EE244) delivered with the interim Rolls-Royce Welland Series I engines. Many of these machines were, however, later re-engined with Derwents, and some Meteor IIIs also had long-chord nacelles as fitted to the Meteor IV.

The Airfix kit features oil cooler vents on top of the nacelles. I may be wrong, but weren't these seen only on the short-nacelle Derwents? Can any reader clarify?

Finally, Alfred Alderson's drawing for 'Fighting Colours' (*Airfix Magazine*, December 1968), illustrating the camouflage pattern on EE239, does not show the exhaust caps supplied with the Airfix kit. It seems likely, therefore that EE239 was later re-engined with Derwents—although I have not been able to find any conclusive evidence—and that the Airfix kit should be completed as a Derwent-engined machine. Can M. J. F. Bowyer set the record straight?

Brian Redhead, Northallerton, Yorks.

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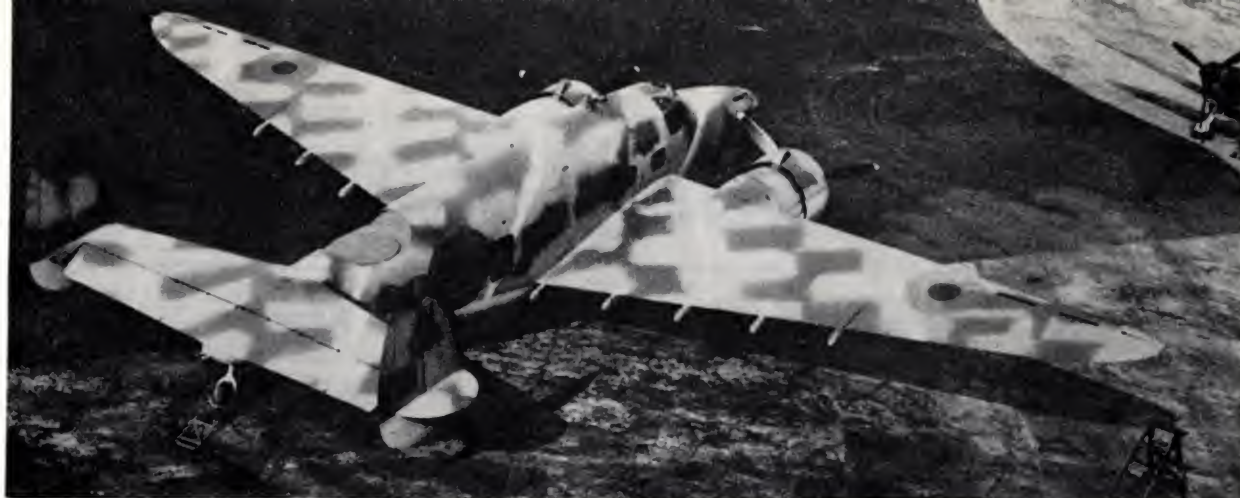
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photoPAGE

More rare pictures from readers with captions by **Michael J. F. Bowyer**. A free Airfix kit is awarded for every picture published, but please note that there is usually a delay of some months before publication due to the limited space at our disposal.



This unusually marked Hudson with turret removed and blanked off would make a fine subject for an Airfix kit conversion. The aircraft was one of two at the PRDU (Photographic Reconnaissance Development Unit) at Heston in May 1940. Colours were light blue (basic) top surface with sea green dapple and off white streaky lines running diagonally across the dapple pattern. The underside was Sky; roundels were B type and serials were overpainted. Pictures from C. M. Rice were taken by his father-in-law Sqn Ldr J. E. G. Archbald. Also visible (lower view) is the same Ensign airliner as shown last month (it was used for courier trips to France before Dunkirk, hence the rudder stripes), and a Harvard (P5070 or P8070) with yellow tops to its wingtips.



Farnborough Colours, 1970 — from page 182

drawings. Buccaneers in the flying display drawn from 12 Sqn included XW528. No 12 Squadron's fox badge graces each side of the intakes on the unit's aircraft.

An attractive but by no means easy kit conversion is building the Airfix Jet Provost as a BAC 167 or Jet Provost T5. XW315 in the latest 'JP' scheme was on show, but more alluring were the Singapore defence force aircraft finished in dark green and dark brown camouflage with light grey under surfaces. Whereas many British-built aircraft favoured silver under surfaces until a few years ago, Light Aircraft Grey now predominates. A red band encircled the rear fuselage of these Singapore Strikemasters and tip tanks were red. '315' appeared on one machine in white forward of the fuselage roundels.

Mention of unusual foreigners leads to a surprise item, the second Canberra B62 for Argentina. In its dark green/medium sea grey/light grey finish with white trim and bold 'B-102' markings, it would make an interesting model. The accompanying illustration, for which we are much indebted to the British Aircraft Corporation, gives all the necessary detail for such a model — now all that is needed is an Airfix Canberra (flying variety).

Whilst one awaits any such eventuality it is possible to get busy on the Harrier kit and, with care and skill, produce a T Mk 2 with its curious tail boom, Dark Green/Dark Sea Grey/Light Aircraft Grey finish and red and blue roundels. The latter appear on the nose and above the wings to improve the camouflage effect, vital in the type of situation in which the Harrier performs. All Harriers will in due course appear thus adorned. No 1 Squadron was showing its Harriers in public for the first

time. They bear a small replica of the 1 Squadron badge/flash on the nose and now have white fin letters. 'D' was XV792, 'Y' XV753. Red warning lines are painted above the centre section of the aircraft. Red-white-blue roundels remain under the wing tips. Meanwhile, Harriers of the Conversion Unit have been carrying the unit's name in white on the nose, 'HARRIER' appearing above a yellow and black grasshopper with 'CONVERSION UNIT' below.

A number of RAF transports were to be seen. Regrettably none wore squadron markings, apart from Wessex helicopters. A most striking item making its debut at Farnborough was the red and white tipping of propellers, astonishingly clear on the disc. It has long been a feature of helicopter tail rotor blades. Nose and tail 'last three' on the Hercules has been a standard feature for about a year. Backing up the heavies were Phantoms of 6 Sqn in Dark Green/Dark Sea Grey/Light Aircraft Grey finish. They had individual letters aft of the fin stripe in white above which was the light blue and red 'gunners stripe' of the squadron. On the nose the Phantoms had a flying can opener motif recalling their 'tank bashing' days in the desert war. 'N' was XV432, 'M' XV480. Wessex helicopters of 72 Sqn have black under surfaces and as a newish feature double identity letters, also black and aft of the roundel. 'AD' was XT603, 'AA' XV719.

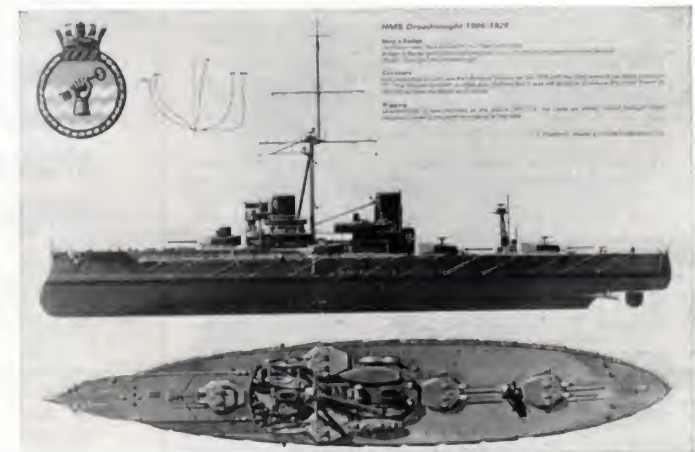
No mention of 'Farnborough 1970' would be complete without some reference to Concorde. What a magnificent machine she is, and how superbly she performed at slow speeds.

Michael J. F. Bowyer

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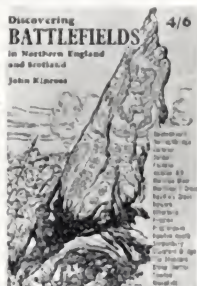
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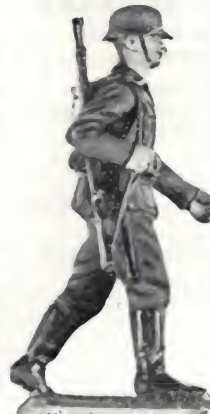
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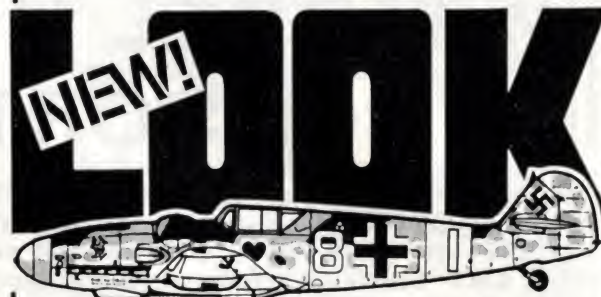
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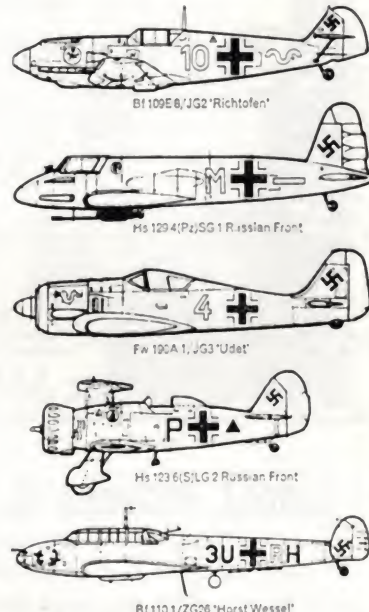
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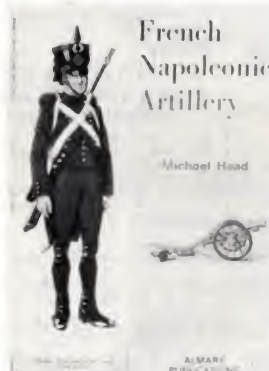
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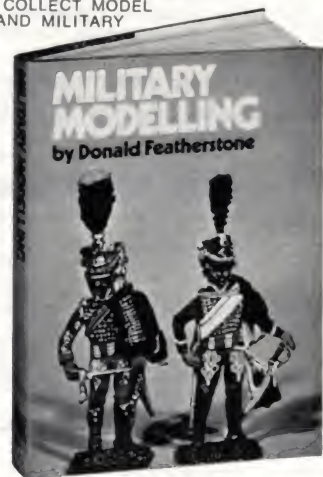
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